

1185705 - R8 SDMS

Contact info

## Contacts for Silverton Monthly Sampling

### Sampling related:

Bill Simon ARSG Coordinator: home 970 385-4138 – PLEASE DO NOT CALL BEFORE 9a.m.

Sabrina Forrest EPA R8: wk 303-312-6484, cell 303-589-1286

Peter Butler - 970-259-0986

Margaret Williams EPA R8: wk 303-312-6943

Bill Schroeder EPA R8: wk 303-312-7755, cell 303-249-7457

Jeff McPherson EPA R8: wk 303-312-7752, cell 720 201-8476 cell 2 303 396 8261

Lisa Richardson: cell 970-769-5363

Kay Zillich USFS/BLM: wk 970-385-1239, cell 970-759-4787

Tom Johnson BLM: wk 970-385-1242, cell 970-769-3254

Debbie Cokes: Volunteer/Colo Goldfields: hm ofc; 970-626-3099, cell 970-417-6661

Bill Coughlin Western Stream Works: Volunteer: 970 708-2139

Kirstin Brown DRMS: 970-903-7889

Steve Fearn 970 387 5813 cell 970 946 9243

### Analytical Related:

US Environmental Protection Agency

Region 8 Laboratory Biology Team, 8 TMS-L

16194 West 45th Drive

Golden, CO 80403

Attn: Jack Sheets: 303-312-7793; E-mail: [sheets.jack@epa.gov](mailto:sheets.jack@epa.gov)

Paragon Analytics: Only for Acidity as CaCO<sub>3</sub>/TDS/TSS

225 Commerce Drive / Fort Collins, CO 80524

ph: (970) 490-1511 / toll free (800) 443-1511 / fx: (970) 490-1522

**Put on the COC and call her when samples shipped: Upper Animas PO#:9883**

**Contact: Proj Mgr. Amy Wolf 970-490-1511 x 201, [awolf@paragonlabs.com](mailto:awolf@paragonlabs.com)**

**Client Support: Debbie Fazio 970-490-1511, [dfazio@paragonlabs.com](mailto:dfazio@paragonlabs.com)**

Directions to FEDEX Montrose (near the Regional Airport):

**FedEx Express Ship Center**

1640 N Townsend Ave  
Montrose, CO 81401

**Directions:** Depart on US-550 [SR-789] (North) 59.2 miles. Keep STRAIGHT onto US-50 [N Townsend Ave. 1.3 miles, Arrive 1640 N Townsend Ave, Montrose, CO 81401, US

<b>Hours of Operation</b>	<b>Latest Express drop-off</b>
---------------------------	--

Mon 9:00 AM-5:30 PM	Mon 5:30 PM
Tue 9:00 AM-5:30 PM	Tue 5:00 PM
Wed 9:00 AM-5:30 PM	Wed 5:30 PM
Thu 9:00 AM-5:30 PM	Thu 5:00 PM
Fri 9:00 AM-5:30 PM	Fri 5:30 PM
Sat 9:00 AM-12:00 PM	Sat 12:00 PM
Sun CLOSED	Sun No Pickup

Directions to FEDEX Durango

**FedEx Express Ship Center**

115 Bodo Dr  
Durango, CO 81303

**Directions:** Depart on US-550 [SR-789] (South) 48.2 miles; Keep STRAIGHT onto US-160 [US-550] 1.7 miles. Turn RIGHT (West) onto Bodo Dr , Arrive 115 Bodo Dr, Durango, CO 81303, US 0 miles

<b>Hours of Operation</b>	<b>Latest Express drop-off</b>
---------------------------	--

Mon 9:30 AM-4:15 PM	Mon 4:15 PM
Tue 9:30 AM-4:15 PM	Tue 4:15 PM
Wed 9:30 AM-4:15 PM	Wed 4:15 PM
Thu 9:30 AM-4:15 PM	Thu 4:15 PM
Fri 9:30 AM-4:15 PM	Fri 4:15 PM
Sat 9:00 AM-1:00 PM	Sat 1:00 PM
Sun CLOSED	Sun No Pickup



**Safety Related:**

Police, Fire or Medical Aid	911
Mercy Medical Center	(970) 247-4311
San Juan County Sheriff	(970) 387-5531
Silverton Fire (Non-emergency)	(970) 387-5523
(EPA) National Spill Response Center (Spills>RQ)	800-424-8802
Rocky Mountain Poison Control Center	(303) 739-1123, (800) 332-3073

EPA call down: Primary - Johanna Miller – 303-312-6804, cell 303-886-1635, hm 303-271-0063

**Directions to Emergency Services:**

The nearest hospitals/medical centers to Silverton are:

**Mercy Medical Center Of Durango** - about 55 miles south of Silverton, Durango, at  
1010 Three Springs Blvd.  
Durango, CO 81301  
(970) 247-4311

Three Springs Blvd. intersects the north side of Hwy 160 East between the Hwy 160 East / Hwy 550 South intersection (Farmington Hill) and the Hwy 160 / County Road 234 / Highway 172 intersection (Elmore's Corner). Directions are also available by calling (970) 247-4311.

**Montrose Memorial Hospital** - about 60 miles north of Silverton at 800 South Third Street  
Montrose, CO 81401 (970) 249-2211

**Access related:**

Willy Tookey County Administrator: 970-387-5766  
Elyse Ackerman City Administrator: 970-387-5522  
Todd Hennis property owner in and around Gladstone: 303-569-0155, cell 303-514-7015  
John Ferguson local contact if Todd unavailable: 970-749-2279  
Steven Guyer Colorado Goldfields: 303-683-3338

**Hotels:** See <http://www.silvertoncolorado.com/index.asp?DocumentID=178>  
EPA booked at Red Mtn RV **Toll Free:** 888-970-5512 <http://www.redmtmotelrvpk.com/>  
or Teller House **Phone:** 970-387-5423, <http://www.tellerhousehotel.com/>  
Triangle(970) 387-5780 <http://trianglemotel.com/>

## 2009 SJPLC AML Field Contact List

Name	Agency	Work Phone	Cell Phone	Supervisor	Supervisor Contact
Tom Johnson	BLM	970-385-1242	970-769-3254	Richard Rymerson	970-946-9672
Lisa Richardson	BLM	970-387-5171	970-769-5363	Jed Botsford	970-884-1436
Barbara Hite	BLM	303-239-3711	303-638-4478	Charlie Beecham	303 239-3773
Brent Lewis	BLM/NOC	303-236-0550	720.231.1349	Debra Dinville	303.236.6430
Paul Meyer	BLM/NOC	303-312-6312	720.480.3709	Debra Dinville	303.236.6430
Silverton Office	BLM/FS	970-387-5530	--	--	--
Chelsea Little	MSI	None	814-937-6259	Aaron Kimple	970-749-7916
Amanda Goldstein	MSI	None	440-856-6072	Aaron Kimple	970-749-7916
Kirsten Brown	DRMS	970-903-7889	970-247-0195		
Sabrina Forest	EPA	303-312-6312	303-589-1286		
<i>Kay Zillich</i>		<i>970 385 1239</i>	<i>970 759 4787</i>		

MSI - Mountain Studies Institute

Data Stuff



Re: Fw: Excel spreadsheets of EPA/BLM collected water quality data  
 Megan\_Dudevoir  
 to:  
 Sabrina Forrest  
 12/09/2010 01:56 PM  
 Cc:  
 Andrew\_Longworth  
 Show Details

# 1 Attachment



church p 74.pdf

Sabrina,

To answer Bill's questions:

1. I am not sure about the broken link, I will talk with Andrew about that on Monday.
2. The data we used was from November of each year. We went with data from one month to make trends easier to see by eliminating seasonal variation. Also, this would eliminate any variation caused by times of year that Sunnyside Gold Corp was treating Cement Creek.
3. In the Church report on page 74 there is a section which describes the history of reclamation activities in Cement Creek. This indicates that between fall of 1996 and 1999, during non-runoff periods, Cement Creek was diverted and treated to mitigate short term impact of remedial activities. The end of this treatment in 1999 would explain the jump. I have attached a scan of page 74.

Let me know if you need anything else.

Also, the sampling trip report is being reviewed and will get to you early next week.

Megan J. Dudevoir  
 URS Operating Services, Inc.  
 1099 18th Street, Suite 710  
 Denver, CO 80202  
 Ph: 303-291-8264  
 Fx: 303-291-8296

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Forrest.Sabrina@epamail.epa.gov

12/09/2010 12:30 PM

To andrew\_longworth@urscorp.com, jeremiah\_erwin@urscorp.com,  
 megan\_dudevoir@urscorp.com

cc

Subject Fw: Excel spreadsheets of EPA/BLM collected water quality data

All ( I realize Andrew may not be available any longer), Can you help me get answers for Bill Simon's questions?

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
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----- Forwarded by Sabrina Forrest/R8/USEPA/US on 12/09/2010 12:29 PM -----

From: "William Simon" <wsimon@frontier.net>  
To: Sabrina Forrest/R8/USEPA/US@EPA, "Peter Butler" <pbutler@wildblue.net>  
Cc: "Fearn Engineering" <fearneng@rmi.net>, <andrew\_longworth@urscorp.com>, Steven Way/R8/USEPA/US@EPA  
Date: 12/09/2010 09:53 AM  
Subject: RE: Excel spreadsheets of EPA/BLM collected water quality data

I don't understand your "broken link" mentioned below?

I also don't see that Andrew or Church explain what happened in 1999 to cause that significant jump in Cd, Cu, and Zn. Since the data and dates are not included I can't be sure but it might have something to do with the time of year the samples were taken -- SGC treated all of CC at some times of year (low flow) and none of CC at other times of year. I need more information-- what months or is this a plot of yearly averages?

Bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Tuesday, December 07, 2010 8:24 AM  
To: Peter Butler; 'William Simon'  
Cc: 'Fearn Engineering'; andrew\_longworth@urscorp.com;  
Way.Steven@epamail.epa.gov  
Subject: RE: Excel spreadsheets of EPA/BLM collected water quality data

Peter and Bill, I just want to follow up to see if the ARSG web site does in fact have a broken link or something for the 2004-2009 data the START staff were looking for when EPA was outlining how to possibly respond to Todd Hennis' letter. Also, Andrew Longworth noted the following with regard to the 1999 spike:

"I was digging through some data/reports here and found something to explain the 1999 jump in concentrations. It turns out that between 1996 and 1999 water from cement creek above American Tunnel was treated then between 2002 and 2003 water from Gold King was treated. The charts I provided were based on treatment stopping in 2003 and did not take into account the switch between the two. I found this information in the Stanley Church 2007 "The effects of acidic mine drainage from historical mines in the Animas River watershed, San Juan County, Colorado" report."

Here are the draft charts that Andrew put together for us. Note that we had him average the chronic water quality standards to simplify the visuals, since there is alot going on.

(See attached file: CadmiumCC48A72A68Linear.pdf) (See attached file: CopperCC48A72A68Linear.pdf) (See attached file: ZincCC48A72Linear.pdf)

Lastly, is the ARSG responding to Todd's follow up letter? I don't believe EPA will do so; we will respond to relevant issues as needed in future meetings with the County and community. Regarding a follow up meeting with them, I think it would be beneficial to wait until we have some idea of what the November data tell us about overall listability. Therefore, I hope that could happen in February, but it may take until March.

Thanks!

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
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From: "Peter Butler" <pbutler@wildblue.net>  
To: Sabrina Forrest/R8/USEPA/US@EPA, "'William Simon'"  
<wsimon@frontier.net>, "'Fearn Engineering'"  
<fearneng@rmi.net>  
Date: 11/19/2010 09:55 AM  
Subject: RE: Excel spreadsheets of EPA/BLM collected water quality data

Thanks! Sabrina.

From: Forrest.Sabrina@epamail.epa.gov [  
<mailto:Forrest.Sabrina@epamail.epa.gov>]  
Sent: Thursday, November 18, 2010 4:29 PM  
To: William Simon; Peter Butler; Fearn Engineering  
Subject: Excel spreadsheets of EPA/BLM collected water quality data  
Importance: High

All, Sorry for the delays in getting these files to you. These are all the data that have been loaded into the Scribe database so far.

I have asked for the START contractor to help get some "pictures" of the data we have so far with regard to looking at Cement Creek concentrations and then have A72 looked at compared to standards, but I imagine you may be already working on this to show the commissioners the relative impacts from Cement on the Animas. Do you have the flow data that Bill Schroeder may have passed along? If not, it is in the Summary file.

I have asked our TMDL staff to help get flow duration curves generated too; they are supposed to help us understand where the loads are coming from at high, moderate, and low flow. I have much to learn..

Sabrina

increases in metal concentrations resulting from the removal of contaminated mine waste followed by continued reduction in the copper concentration in Mineral Creek. The second major remediation project at sites 79–80 (Fig. 11) resulted in long-term reduction of the copper concentration and significant improvement in copper load in Mineral Creek (Fig. 14A). A similar reduction in zinc (and cadmium) concentrations is also evident (Fig. 14B).

The total recoverable aluminum concentration (not shown) fluctuated around the baseline concentration until 2002, when it started into a steep decline. This change may be driven, in part, by the drought conditions experienced in 2002. The 12-period moving average through November 10, 2004, indicates that total recoverable aluminum concentration was 667  $\mu\text{g/L}$  lower than during the 1994–1996 baseline period.

Total recoverable iron (not shown) and dissolved manganese concentrations were generally higher than the baseline condition from 1997 through most of 2002. Since 2002, concentrations of both constituents are approaching the concentrations of the baseline period. Remediation initiated at site #79 appears to have resulted in a substantial increase in the concentration of manganese (Fig. 14C).

Sulfate concentration (Fig. 14D) increased following the initial remediation work, but has been dropping since 2002. Evidence of the improved water-quality conditions downstream are indicated in the reach of Mineral Creek downstream from the confluence of South Fork Mineral Creek, which has since begun to show recovery of some invertebrates (W. Simon, pers. comm., 2004). Since 2002, the concentration of sulfate has dropped below the concentration of the baseline period.

Dissolved cadmium (not shown), copper, and zinc concentrations have all declined since late 1997 (Figs. 14A and B). The 12-period moving average indicates that through November 10, 2004, dissolved cadmium, copper, and zinc were 0.38  $\mu\text{g/L}$ , 14  $\mu\text{g/L}$ , and 94  $\mu\text{g/L}$ , respectively, less than the concentrations during the 1994–1996 baseline period.

### Cement Creek Basin

Cement Creek, which carries high concentrations of cadmium, copper, zinc, aluminum, and iron (Fig. 9), is not capable of supporting aquatic life even with remediation. However, remediation in the Cement Creek basin is vital to downstream water quality. The relationship between cadmium, copper, and zinc concentration, stream flow, and seasonality is weak in the Cement Creek basin. Remediation activities, which have been under way in Cement Creek since 1991, accompanied by treatment of the discharge from the American tunnel (site #96, Fig. 13) may explain the weak relationship among concentration, stream flow, and seasonality for the target metals—cadmium, copper, and zinc. The valve on the first American tunnel bulkhead (site #96) was closed in September 1996. The second bulkhead in the American tunnel (site #116) was sealed in August 2002. Treatment of Cement Creek upstream from the American tunnel (site #96) began in the fall of 1996 and continued through the non-runoff periods

through 1999. Treatment during this period resulted in very significant reductions in mean metal concentrations (Fig. 15). The permit for the American tunnel was transferred to the Gold King mine in December 2002. Gold King continued to treat the remaining discharge from the American tunnel through May 2003. The mine pool in the Sunnyside mine reached equilibrium by November 2000; however, this was preceded by a large increase in the volume of flow from the Mogul mine (site #31) in 1999 causing a bulkhead to be placed in that portal in 2003. The Sunnyside mine pool related mitigations were completed in 2001. Remediation has occurred at 15 sites in the basin (Fig. 13; Table 5). Projects in the Cement Creek basin since October 1996 include hydrologic runoff/runoff controls at Gold King mine (site #111), Joe and Johns mine (site #87), Lark mine (site #86), and Mayday mine (site #181). Settling ponds and runoff/runoff controls were constructed in 1998 at the Mammoth mine (site #148). Runoff/runoff controls and complete removal of mine wastes at the Hercules and Galena Queen mines (sites #82 and #83) were completed in 2001. A passive treatment system consisted of aerobic limestone drains, and settling ponds were implemented at the Elk tunnel (site #147) in 2003.

Dissolved cadmium (not shown) decreased significantly following initial treatment of Cement Creek. A series of high cadmium concentrations from July 1999 through November 1999 caused the 12-period moving average to rise above the baseline condition. This was repeated in 2000 but to a lesser degree. The near baseline condition was reached in 2002, but a steady trend upward beginning in 2003 found the average cadmium concentration to be 1.7  $\mu\text{g/L}$  higher through November 10, 2004, than during the baseline period.

The dissolved copper concentration (Fig. 15A) has fluctuated around the baseline condition except for short periods in 1997 and 1999. Exceptionally high copper concentrations were measured from August 1999 through November 1999. Dissolved copper exceeded three standard deviations on four out of seven sampled dates in that time period.

The dissolved zinc concentration (Fig. 15B) decreased over 250  $\mu\text{g/L}$  following closure of the American tunnel and treatment of upper Cement Creek through late 1998. The zinc concentration increased through 1999 reaching a maximum of nearly 300  $\mu\text{g/L}$  higher than the baseline concentration by early 2000. The zinc concentration then declined to baseline concentration through early 2003. The zinc concentration was 341  $\mu\text{g/L}$  higher than the baseline concentration in November 2004.

The concentration of dissolved manganese (Fig. 15C) was reduced over 500  $\mu\text{g/L}$ , on the average, at C48 from the time treatment began until the summer of 2002. By November 10, 2004, manganese concentrations had returned to the baseline concentration.

The 12-period moving average total recoverable aluminum (not shown) concentration dropped more than 900  $\mu\text{g/L}$  below the baseline condition for the first eight months following the closing of the American tunnel and initiation of treatment of Cement Creek. The average concentration remained less than





**Fw: Updated Animas Stations Table**  
**William Schroeder to: Sabrina Forrest**

10/14/2010 08:13 AM

Beaner-

Here's Bill Simon's response to yesterday's e-mail about the reasons for adding CCOPP-11 and -12.

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755

Cell: 303-249-7457

Fax: 303-312-7800

Email: Schroeder.William@EPA.gov

— Forwarded by William Schroeder/R8/USEPA/US on 10/14/2010 08:12 AM —

From: "William Simon" <wsimon@frontier.net>  
To: William Schroeder/R8/USEPA/US@EPA  
Date: 10/13/2010 07:19 PM  
Subject: RE: Fw: Updated Animas Stations Table

Well your explanation is complete and logical. Given the other sites you are monitoring it makes sense to add these. I still am a bit concerned about the "well mixed" condition. I've been fooled before by thinking a station is far enough away from a confluence to be well mixed only to later notice that during a storm event that stream was not as well mixed as I had envisioned. We just do the best we can. Thanks. Bill

-----Original Message-----

From: Schroeder.William@epamail.epa.gov  
[mailto:Schroeder.William@epamail.epa.gov]  
Sent: Wednesday, October 13, 2010 2:13 PM  
To: William Simon  
Cc: Forrest.Sabrina@epamail.epa.gov  
Subject: Re: Fw: Updated Animas Stations Table

Hey Bill-

I received the attached from Sabrina and figured it would be a good idea to explain why we added sites CCOPP-11 and CCOPP-12 to our sampling plan. When we started our sampling in 2009, the only sites we had on Cement Creek were CC01F (upstream of the Grand Mogul), CC18B (upstream of the American Tunnel and downstream of the North Fork), CC18 (downstream of the American Tunnel), and CC48 (at the USGS gauge upstream of the Animas). When we came across the Queen Anne drainage later that summer, we decided to add sites CC01H and CC01T to bracket its effect on Cement Creek. Likewise, site CC01U was added to bracket the Mogul Sublevel 1 tributaries in September 2009. When I graphed all of the 2009 data last fall, I noticed how the metals concentrations in Cement Creek dramatically increased between CC01U and CC18B due to inflows from the Mogul, the Red and Bonita, and the North Fork but we

couldn't tease out how each individual drainage was affecting water quality in Cement Creek. For this reason, CCOPP-11 and CCOPP-12 were added. When comparing CCOPP-12 with CC01U, we can see the affects of the Mogul and when comparing CCOPP-12 with CCOPP-11, we can see the affects of the Red and Bonita. We can also compare CCOPP-11 with CC18B to bracket the affect of the North Fork/Gold King 7-Level on water quality. Because water is very well mixed at CCOPP-11 and CCOPP-12, integrated width and depth sampling would not be necessary.

Hopefully this clears things up a little! I will be sure to rename these opportunity sites as you specify for the next round of sampling. Attached you will find an updated list of our sampling stations.

-Bill-

(See attached file: Animas Stations.xls)

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov

From: Sabrina Forrest/R8/USEPA/US  
To: William Schroeder/R8/USEPA/US@EPA  
Date: 10/12/2010 09:56 AM  
Subject: Fw: Updated Animas Stations Table

See Bill Simon's input on that latest couple of OPP samples.

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
Fax: 303-312-6065  
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E-mail: forrest.sabrina@epa.gov

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From: "William Simon" <wsimon@frontier.net>  
To: Sabrina Forrest/R8/USEPA/US@EPA  
Date: 10/11/2010 09:48 PM  
Subject: RE: Updated Animas Stations Table

Sabrina, we already have CC03 which is "below the lower ferrocrete" which likely is also below the confluence of Red & Bonita with CC. If so then CCOPP-11 is CC03. CC03B is below the ferricrete area above the Red and Bonita ferricrete. That would be above the Red & Bonita confluence so will that do for CCOPP-12? Are you taking integrated width & depth samples at these locations? If not they are meaningless to compare to the R&B discharge. Not sure why your sampling there though. Bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Wednesday, August 25, 2010 4:53 PM  
To: wsimon@frontier.net  
Cc: Peter Butler; Steve Fearn  
Subject: Fw: Updated Animas Stations Table

Hi Bill, I hope you are doing well. I am forwarding the June 2010 sample location table. Could you help us out by assigning some sample IDs to replace the CCOPP-11 and CCOPP-12 that are shown in the table?

I am looking forward to seeing everyone in September. There are 3-4 of us from EPA planning to come down for the site tours.

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
Fax: 303-312-6065  
Agency Cell: 303-589-1286

E-mail: forrest.sabrina@epa.gov

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----- Forwarded by Sabrina Forrest/R8/USEPA/US on 08/25/2010 04:46 PM -----

From: William Schroeder/R8/USEPA/US  
To: Sabrina Forrest/R8/USEPA/US@EPA  
Date: 08/16/2010 09:22 AM  
Subject: Updated Animas Stations Table

Beaner-

Dan Michor was able to differentially correct the July 2010 gps file I collected on the Animas. I updated the stations table with these corrected values and added the new mogul tailings drainage sites we sampled. Here's the most up to date version:

(See attached file: Animas Stations.xls)

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov



**RE: Updated Animas Stations Table**  
**William Simon to: Sabrina Forrest**

10/11/2010 09:48 PM

Sabrina, we already have CC03 which is "below the lower ferrocrete" which likely is also below the confluence of Red & Bonita with CC. If so then CCOPP-11 is CC03. CC03B is below the ferrocrete area above the Red and Bonita ferrocrete. That would be above the Red & Bonita confluence so will that do for CCOPP-12? Are you taking integrated width & depth samples at these locations? If not they are meaningless to compare to the R&B discharge. Not sure why your sampling there though. Bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Wednesday, August 25, 2010 4:53 PM  
To: wsimon@frontier.net  
Cc: Peter Butler; Steve Fearn  
Subject: Fw: Updated Animas Stations Table

Hi Bill, I hope you are doing well. I am forwarding the June 2010 sample location table. Could you help us out by assigning some sample IDs to replace the CCOPP-11 and CCOPP-12 that are shown in the table?

I am looking forward to seeing everyone in September. There are 3-4 of us from EPA planning to come down for the site tours.

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
Fax: 303-312-6065  
Agency Cell: 303-589-1286

E-mail: forrest.sabrina@epa.gov

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----- Forwarded by Sabrina Forrest/R8/USEPA/US on 08/25/2010 04:46 PM -----

From: William Schroeder/R8/USEPA/US  
To: Sabrina Forrest/R8/USEPA/US@EPA

Date: 08/16/2010 09:22 AM  
Subject: Updated Animas Stations Table

Beaner-

Dan Michor was able to differentially correct the July 2010 gps file I collected on the Animas. I updated the stations table with these corrected values and added the new mogul tailings drainage sites we sampled. Here's the most up to date version:

(See attached file: Animas Stations.xls)

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov



**RE: Updated Animas Stations Table**  
**William Simon to: Sabrina Forrest**

10/11/2010 09:48 PM

History: This message has been forwarded.

Sabrina, we already have CC03 which is "below the lower ferrocrete" which likely is also below the confluence of Red & Bonita with CC. If so then CCOPP-11 is CC03. CC03B is below the ferricrete area above the Red and Bonita ferricrete. That would be above the Red & Bonita confluence so will that do for CCOPP-12? Are you taking integrated width & depth samples at these locations? If not they are meaningless to compare to the R&B discharge. Not sure why your sampling there though. Bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Wednesday, August 25, 2010 4:53 PM  
To: wsimon@frontier.net  
Cc: Peter Butler; Steve Fearn  
Subject: Fw: Updated Animas Stations Table

Hi Bill, I hope you are doing well. I am forwarding the June 2010 sample location table. Could you help us out by assigning some sample IDs to replace the CCOPP-11 and CCOPP-12 that are shown in the table?

I am looking forward to seeing everyone in September. There are 3-4 of us from EPA planning to come down for the site tours.

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
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E-mail: forrest.sabrina@epa.gov

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----- Forwarded by Sabrina Forrest/R8/USEPA/US on 08/25/2010 04:46 PM

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Date: 08/16/2010 09:22 AM  
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(See attached file: Animas Stations.xls)

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov





**Re: additional sampling locations needed in Cement Creek**   
**Sabrina Forrest** TO: **William Schroeder**

08/31/2010 08:47 AM

HEY THERE BILL, SEE PRETTIER PURPLE CAPS BELOW

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
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William Schroeder      Beaner- See below in pretty green!

08/30/2010 03:31:25 PM

From: William Schroeder/R8/USEPA/US  
To: Sabrina Forrest/R8/USEPA/US@EPA  
Date: 08/30/2010 03:31 PM  
Subject: Re: additional sampling locations needed in Cement Creek

---

Beaner-

See below in pretty green!

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov

Sabrina Forrest      Bill, Sorry I forgot about another thing Steve Wa...

08/25/2010 05:02:29 PM

From: Sabrina Forrest/R8/USEPA/US  
To: William Schroeder/R8/USEPA/US@EPA  
Cc: Steven Way/R8/USEPA/US@EPA  
Date: 08/25/2010 05:02 PM  
Subject: additional sampling locations needed in Cement Creek

---

Bill, Sorry I forgot about another thing Steve Way and I talked about. We want to be sure to capture some sample locations from here on out at a few locations. A couple may coincide with some sites I see in the most recent location table you sent.

1. the collapsed adit at top of Red & Bonita (EPA has access now) - **called CC03C**
2. So you would now like to sample two locations on the Red and Bonita. One at CC-03D beside the road and another where the flow comes out of the ground at CC03C. I'm not sure that flow will be possible at CC03C. YES, PLEASE SAMPLE BOTH, BUT WE UNDERSTAND THAT NO FLOW WILL BE MEASURED AT CC03C.
3. below the Mogul and low enough to be just above Cement Creek flow - **could be either MTD-4 or FD-1, might need to see mapped**
4. MTD-4 is definitely the combined flow from the seeps at the tailings. FD-1 was the Fenn Drainage from the wetland that is downstream. Haven't seen the June data to know if this had high metals concentrations. I'd use MTD-4 and not FD-1 but I can sample both if you would like. PLEASE USE MTD-4
5. Cement Creek between Mogul/wetland area and the Red & Bonita inflow into Cement Creek. - **was CCOPP-12, hope to have that one renamed by ARSG soon**
6. Yup, CCOPP-12 is the site. Let me know what I should call it when Simon decides to rename it. I think we also need a name for CCOPP-11 (Cement Creek ups of the N. Fork). I HAVE NOT HEARD ANYTHING FROM ARSG YET ON THE NEW NOMENCLATURE FOR THOSE OPP SAMPLES....IF WE DON'T HEAR FROM THEM BY SEPT 10, USE THE OPP NAMES FOR ANOTHER MONTH.

Thanks!

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
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E-mail: [forrest.sabrina@epa.gov](mailto:forrest.sabrina@epa.gov)

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Re: additional sampling locations needed in Cement Creek   
William Schroeder to: Sabrina Forrest

08/30/2010 03:31 PM

Beaner-

See below in pretty green!

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov

Sabrina Forrest

Bill, Sorry I forgot about another thing Steve Wa...

08/25/2010 05:02:29 PM

From: Sabrina Forrest/R8/USEPA/US  
To: William Schroeder/R8/USEPA/US@EPA  
Cc: Steven Way/R8/USEPA/US@EPA  
Date: 08/25/2010 05:02 PM  
Subject: additional sampling locations needed in Cement Creek

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5. Cement Creek between Mogul/wetland area and the Red & Bonita inflow into Cement Creek. - **was CCOPP-12, hope to have that one renamed by ARSG soon**
6. Yup, CCOPP-12 is the site. Let me know what I should call it when Simon decides to rename it. I think we also need a name for CCOPP-11 (Cement Creek ups of the N. Fork).

Thanks!

Sincerely,

Sabrina Forrest  
NPL Coordinator &  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
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Agency Cell: 303-589-1286

E-mail: [forrest.sabrina@epa.gov](mailto:forrest.sabrina@epa.gov)

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William  
Schroeder/R8/USEPA/US  
10/30/2009 08:40 AM

To Sabrina Forrest <telebean914@yahoo.com>, Sabrina  
Forrest/R8/USEPA/US@EPA  
cc John Wieber/R8/USEPA/US@EPA  
bcc

Subject Re: august table comments

Beaner-

I made all the changes you specify below. Our QC person told me to enter that number as 9.55 with the "J" qualifier. There is a note at the bottom of the spreadsheet stating that this number could really be 955. For purposes of calculating loading and comparing concentrations to criteria, I will probably create another spreadsheet that combines data from all sampling events. I will have to work on that later though since my boss is telling me that my #1 priority should be about completing data packages. Unfortunately, his wish must be my command. Let me know if you have any more comments and enjoy the weekend!

-B-



Animas Stations.xls August 2009.XLS July 2009.XLS June 2009.XLS May 2009.XLS

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755

Cell: 303-249-7457

Fax: 303-312-7800

Email: Schroeder.William@EPA.gov

Sabrina Forrest <telebean914@yahoo.com>



Sabrina Forrest  
<telebean914@yahoo.com>  
10/28/2009 02:07 PM

To William Schroeder/R8/USEPA/US@EPA  
cc John Wieber/R8/USEPA/US@EPA

Subject august table comments

Bill, The table looks really good and I tried to previously send you a reply from my personal email because I could not open the attachment from our EPA Webmail. grrrrrrr! but Yahoo was having a glitch too. So here they finally are. I am at home in a foot and a half of snow. Unfortunately, I have a few comments and if these comments need to carry through to the May-July tables, I might get choked by Mr. Wieber for prematurely sending him your tables.


1. I want to be sure that all the Cement Creek locations that have a letter extension are capital letters, except for CC02i. that is the only one that Bill Simon put a lowercase on. I may have to go take a closer look at the tables

sent to Mr. Wieber already....woopsie on my part!

2. I think the "J" in 9.55J\* needs defined in the notes below. Then I think the number in the table should go ahead and be either a) 9.55\* with the footnote explaining our belief the reading should be 955J uS/cm explanation or b) the table should show 955J\* with the footnote showing "Field sheet showed 9.55 uS/cm, which is inconsistent with prior readings at that and other nearby locations, therefore, the data are qualified J."

3. Can loading calculations be shown in this set of tables, or are you doing those separately?

Martin  
Mccomb/R8/USEPA/US  
09/14/2009 09:53 AM

To Sabrina Forrest/R8/USEPA/US@EPA  
cc Tony Selle@EPA, Julie Kinsey/R8/USEPA/US@EPA  
bcc  
Subject Suggestions for ARSG 

Sabrina:

There is much work that needs to be done to get this data into ANY database format much less something as regimented as STORET/WQX. If he wants to do this, I suggest 2 stages: one to get this information into a format that can be properly assessed for database content and quality and a second stage to migrate the data into STORET/WQX.

To complete the first stage, he needs to do several painful steps. Note that these Stage 1 suggestions are not specific to EPA requirements...they simply reflect good / standard data management practices. For Stage 1, Bill needs to:

1. Generate proper data tables. These tables need to have one row of column headings (see the "CC site key" tab ... the data starts on row 7 and it should start on row 2). Each column MUST have a column name in the header row (see the "UA site key" tab ... I think this is where the analytical data is but you need to go to the "Data Format" tab to even get a hint of what the data is). Bill also needs to not imbed sub - header rows within the data table (see row 331 of the "UA site key" tab).

2. Data within each column must be somewhat consistent. For example, when lat/longs for sites are provided, the format is not consistent ... there are decimal degrees mixed in with degrees minutes seconds mixed in with UTM's. Another example...Elevation should be a number not a date.

3. Analytical results must be in their own table and normalized. This table must be related back to the Locations table(s) using a Sample/Location ID. Right now they are mixed in with the sampling locations information and it is organized across the spreadsheet where each column is its own analyte. At a minimum, the data must be normalized...that is formatted so that there is one column for parameter name, one column for sample fraction, one column for result value and one column for result units). It would do this work using a set of access queries but he can do it by utilizing a cut and paste process.

4. There is a lot of key information that is missing including:

- lat/longs (preferably is decimal degrees) for every sampling location for which there are results.
- the datum (NAD83) that the lat longs were collected in
- sample information such as, but not limited to, Sample ID (for every sample), Sample Date, Sample Time, Sample Media
- result information such as, but not limited to, Analytical Procedure, Sample Fraction, Result Units, Detection Limit, Detection Limit Units

5. Its ok for him to separate things out into Codes (see the "Codes" tab), but he needs to make that table a real data table (see first point).

6. I would highly recommend he not trap information into suffixes on other things (see the "Codes" tab).

M

Sabrina Forrest/R8/USEPA/US



Sabrina  
Forrest/R8/USEPA/US  
09/10/2009 04:14 PM

To Martin Mccomb/R8/USEPA/US@EPA  
cc  
Subject Fw: ARSG format

Marty, Thanks again for stopping by...

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
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Agency Cell: 303-589-1286

E-mail: forrest.sabrina@epa.gov

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— Forwarded by Sabrina Forrest/R8/USEPA/US on 09/10/2009 04:14 PM —



"William Simon"  
<wsimon@frontier.net>  
07/30/2009 09:57 AM

To Sabrina Forrest/R8/USEPA/US@EPA  
cc

Subject ARSG format

Here is our current data format. Maybe I had just sent it to Jan and not you – sorry. Bill

William Simon  
8185 C.R.203  
Durango, CO 81301  
Phone: (970) 385-4138  
Call phone first for fax


Please respect my privacy! Do not send this information out to others.



Data Format Mar.08.xls



William  
Batschelet/R8/USEPA/US  
07/23/2009 01:39 PM

To Sabrina Forrest/R8/USEPA/US@EPA  
cc Mark Burkhardt/TMS/R8/USEPA/US@EPA  
bcc  
Subject Re: Animas River 2009 (R8090063) Data Package -  
Amended Report 

History:  This message has been replied to.


The data from our lab undergoes several levels of review prior to its release. First is the analyst's own review. This is followed by a peer review by another analyst who is competent in the area. Finally, entire data package comes to me for a final quality review prior to release. At that time I check the data package for completeness and consistency and verify that the previous reviews were documented and reviewer comments addressed. In addition, I review each of the analytical protocols and verify at least 10 % of the data for each protocol. At that point I release the data and generate the final report. The "Certificate of Analysis" on each page indicates it's a final, QC'ed report. The data does not undergo independent, third-party validation prior to its release from our laboratory. However, we maintain all raw data to support such a review if one is ever necessary. I hope this answers your questions.

Regards,

William H. Batschelet, PhD  
Quality Assurance Officer  
USEPA Region 8 Laboratory  
16194 W 45th Drive  
Golden, CO 80403-1790  
Phone: 303-312-7792  
FAX: 303- 312-7800  
Sabrina Forrest/R8/USEPA/US



Sabrina  
Forrest/R8/USEPA/US  
07/23/2009 12:19 PM

To William Batschelet/R8/USEPA/US@EPA  
cc Mark Burkhardt/TMS/R8/USEPA/US@EPA  
Subject Re: Animas River 2009 (R8090063) Data Package -  
Amended Report 

Are these data already validated, or just reviewed?

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
Agency Cell: 303-589-1286  
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William Batschelet/R8/USEPA/US

William  
Batschelet/R8/USEPA/US

07/22/2009 11:01 AM

To Sabrina Forrest/R8/USEPA/US@EPA

cc Mark Burkhardt/TMS/R8/USEPA/US@EPA

Subject Animas River 2009 (R8090063) Data Package - Amended  
Report

Sabrina,


Attached is the amended laboratory report we discussed and associated data in electronic format for your laboratory service request R8090063 / laboratory project 8905016. The report is amended to correct for misidentification of the sample containers in the dissolved metals analysis by ICP-OES in the original report. No analytical results have been changed. Both this report and the associated EDD are revised.

I regret this happened, and I agree with you that it is best to correct our mistakes as we find them. Feel free to contact me if you have any questions.

William H. Batschelet, PhD  
Quality Assurance Officer  
USEPA Region 8 Laboratory  
16194 W 45th Drive  
Golden, CO 80403-1790  
Phone: 303-312-7792  
FAX: 303- 312-7800

[attachment "8905016 amend\_1 22 jul 09.pdf" deleted by William Batschelet/R8/USEPA/US] [attachment "8905016 AMEND\_1 22 Jul 09.xls" deleted by William Batschelet/R8/USEPA/US]



Re: 2009 data   
William Schroeder to: William Simon  
Cc: "Lisa Richardson", Sabrina Forrest

06/07/2010 01:51 PM

Bill-

Answers to your questions are as follows:

- 1) Someone recorded the conductivity for this site in the field notebook as 9.55. Because our conductivity meter can not record values this low, I believe the decimal point was added as a mistake and the the real value should be 955.
- 2) Dissolved oxygen was entered in % saturation for these four sites during the August 2009 sampling event. The values were converted to mg/L using a formula. These numbers are correct but the data was flagged with the double stars.
- 3) Lisa collected the samples for the Queen Ann the week before we performed the November 2009 sampling event. We submitted those samples to our lab with the samples we collected the following week. There were no field parameters taken because Lisa did not have a field meter.

Hope this helps!

-Bill-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov

"William Simon" Bill, Sabrina, and Lisa;

06/01/2010 08:47:43 PM

---

From: "William Simon" <wsimon@frontier.net>  
To: William Schroeder/R8/USEPA/US@EPA, Sabrina Forrest/R8/USEPA/US@EPA, "Lisa Richardson" <grenadierglassworks@yahoo.com>  
Date: 06/01/2010 08:47 PM  
Subject: 2009 data

---

Bill, Sabrina, and Lisa;

i'm wondering about a few data entries or lack of:

- 1) Field cond. For CC-01C adit reads 9.55 J\* . what does this mean?
- 2) Diss Oxygen is listed as \*\* on 4 locations. What does this mean?
- 3) There are no field parameters entered for the Queen Ann and the two background samples yet there is metals data. ???

Thanks, bill

William Simon  
8185 C.R.203  
Durango, CO 81301  
Phone: (970) 385-4138  
Call phone first for fax

Please respect my privacy! Do not send this information out to others.



"William Simon"  
<wsimon@frontier.net>

09/10/2009 10:11 AM

To Sabrina Forrest/R8/USEPA/US@EPA

cc

bcc

Subject RE: STORET

History:

☒ This message has been replied to and forwarded.

*Look up the Lat/Long don't exist / need to GPS these*

CC02D is the Mogul

→ CC02E is the Gold Point, the mine south of the Mogul also known as SO-7 by Herron.

→ CCo2J is the new designation for the small, newly draining adit between CC02D & CC02E which ii have described as "small adit between CC02D & CC02E".

Okay? Bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Thursday, September 10, 2009 7:13 AM  
To: William Simon  
Subject: Re: STORET

Hi Bill, Peter called me about those discharges and I have asked Bill Schroeder to bring extra containers. Do you have location IDs for those two yet? I could add them to our sampling summary table.

Regarding STORET, I will get you the contact ASAP.

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B.  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
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E-mail: forrest.sabrina@epa.gov

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"William Simon"  
<wsimon@frontier.net>

09/09/2009 05:38

Sabrina Forrest/R8/USEPA/US@EPA

To

cc

PM

STORET

Subject

Sabrina, could you find me a contact with someone who understands and could update me on STORET? I heard EPA is turning it over to private contractor or? Bill

PS. Peter says the small adit just south of the Mogul is now discharging and the next south adit (Gold Point) is also. I wonder if we shouldn't be monitoring those as well, at least 1-2 times/yr?

William Simon  
8185 C.R.203  
Durango, CO 81301  
Phone: (970) 385-4138  
Call phone first for fax

Please respect my privacy! Do not send this information out to others.  
No virus found in this incoming message.  
Checked by AVG - [www.avg.com](http://www.avg.com)  
Version: 8.5.409 / Virus Database: 270.13.86/2355 - Release Date:  
09/09/09 17:50:00



"Debbie Cokes"  
<debbiecokes@montrose.net>  
>

06/03/2009 04:59 PM

To William Schroeder/TMS/R8/USEPA/US@EPA

cc Sabrina Forrest/R8/USEPA/US@EPA

bcc

Subject RE: Field Data

3" Parshall. The staff gauge had level and flow markings.

Debbie Cokes  
970-626-3099

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Wednesday, June 03, 2009 4:42 PM  
To: Thomas L Johnson@blm.gov; czillich@fs.fed.us; debbiecokes@montrose.net  
Cc: Schroeder.William@epamail.epa.gov  
Subject: Fw: Field Data

See Bill's questions below. Can you help us out? If you can, please  
reply directly to him (schroeder.william@epa.gov) and cc me.  
form attached  
(See attached file: CC19 discharge form.pdf)

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
Agency Cell: 303-589-1286  
E-mail: forrest.sabrina@epa.gov

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original message and any attachments.

----- Forwarded by Sabrina Forrest/R8/USEPA/US on 06/03/2009 04:32 PM

-----

William  
Schroeder/TMS/R8  
/USEPA/US

06/03/2009 04:25  
PM

To  
Sabrina Forrest/R8/USEPA/US@EPA

cc

Field Data

Subject

Sabrina-

I just started compiling all of the data from the field data forms and calculating the flows. Checkout the datasheet for site CC19 (American Tunnel). The permanently installed flume showed a reading of 0.48 feet but the throat width of the flume was not recorded. I do see that a reading of 0.2 mgd was recorded on the form - how was that obtained? Was there another gage on the flume? Do you recall if it was a Parshall Flume and what the throat width was? I'll need this info so I can calculate the flow or I will just have to convert mgd to cfs. Let me know your thoughts....

-B-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8  
999 18<sup>TH</sup> STREET- SUITE 300  
DENVER, CO 80202-2466  
Phone 800-227-8917  
<http://www.epa.gov/region08>

Ref: TMS-L

MEMORANDUM

SUBJECT: Sample Disposal of Animas River (R8070059)

FROM: Gregory J. Saunders, Environmental Scientist (signed)  
Laboratory Services Program

TO: Sabrina Forrest  
EPR-B

Please advise us regarding the samples collected at the Animas River sites in June 2007. They will be disposed of on or about August 30, 2007.

Space limitations require that timely disposal of samples be accomplished using defined procedures. In addition, any samples exceeding analytical holding times will be disposed of as appropriate.

The laboratory's policy is not to run or rerun samples that have exceeded holding times. See Region 8 policies R8001 and R8006 signed March 7 and March 6, 2003, respectively, by David Ostrander, Laboratory Director, and Tony Medrano, Quality Assurance Director.

Please advise us by August 30, 2007, whether or not the samples can be disposed of by signing and returning this statement. This also confirms arrival and review of the data package.

If retention of samples is required, please provide the following information:

EPA sample tag number(s)

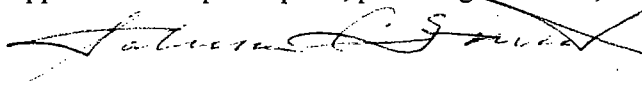
Justification for retention of sample(s)

Expected date of release for disposal

(Default date is when analytical holding times have expired.)

(Samples held for litigation will not be held in cold storage beyond holding times.)

For approval of sample disposal, please sign and date, and return by fax:

 08/27/07

Return to Gregory J. Saunders, Environmental Scientist

Laboratory Services Program, 8TMS-L Fax: (303) 312-8000

303 312 7800  
303 236 7800



Printed on Recycled Paper

*Data START compiled  
& collected 2005/2006*

# **Gladstone Adits Water Quality Data**

Location	Date	Flow (gpm)	pH	Al	Cd	Cu	Fe	Mn	Pb	Zn
Mogul	7/93			3.12	300	210	10000	65000		230 38000
Mogul	6/96			3.25	12700	627	1690	49800	37700	295 139000
Mogul	10/96			2.89	5243	148	6442	51192	9742	206 28091
Mogul	6/97			2.61	3259	98	4567	39240	7195	200 21250
Mogul**	7/05	21		3.11	8210	204	209	47400	2600	311 56000
Mogul**	9/05	27		2.85	7790	184	78	48900	31700	306 51900
Mogul*	7/06			3.3	4400	90	67	36000	24000	230 32000
Mogul**	10/06	11		3.32	4730	97.5	47.3	39100	29200	278 33900 J
GM	10/96			3.43	10085	80.7	2613	824	7284	39.4 16485
GM	6/97			3.34	2114	18	724	4114	1315	30.6 3405
GM**	7/05			3.05	4890	56.2 1730-		9360	3990	29 9540
GM**	9/05			2.75	11800	135	4900	37700	10100	3 25000
RB	6/97			3.01	12630	101	1429	41450	27730	143 18490
RB	9/04			3.2	4800	32.5	250	24400	20400	128 110400
RB**	7/05	210		3.08	3570	25.8	94	48200	20500	67.8 10800
RB**	9/05	224		3.72	3420	23.7	52.5	55000	27200	61 11500
RB*	7/06			5.51	2500 10 U		15	74000	26000 73 U	
RB**	10/06	233		3.8	3250	27.1	4.6	72800	31900	12200 J
GK7**	7/05	42		2.64	56600	156	10700	169000	52000	1 41000
GK7**	9/05	135		2.89	40200	128	7200	1444999	81000	44 46800
GK7*	7/06			3.02	41000	110	7300	140000	40000 73 U	
GK7**	10/06	314		2.98	31700	88.8	7570	125000	51100	45.2 29900 J
AT**	7/05	95		3.2	9720	32	864	34300	19800	27 8770
AT**	9/05	90		4.27	7070	4	7	132999	39000	2 15600
AT*	7/06			3.73	6600 10 U		17	120000	39000 73 U	
AT**	10/06	84		4.2	6890	3.5	11.1	152000	50800	16.8 18600 J

\* Hennis Total Metals data

\*\* EPA data

gpm = gallons per minute

U = Material analyzed for, but not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit

J = Associated numerical value an estimate because the Quality Control criteria were not met.

**ANIMAS RIVER 2009 DATA SUMMARY - Sample Collection Dates and Times**

	May 2009	May 2009	June 2009	June 2009	July 2009	July 2009	Aug 2009	Aug 2009	Sep 2009	Sep 2009	Nov 2009	Nov 2009
Sampling Station	Date	Time	Date	Time	Date	Time	Date	Time	Date	Time	Date	Time
1												
2 Animas River (Upstream to Downstream):												
3												
4 A68	05/19/09	10:45	06/16/09	11:40	07/14/09	10:35	08/18/09	10:45	09/22/09	11:15	11/17/09	11:15
5 A72	05/18/09	19:05	06/16/09	9:45	07/14/09	9:15	08/18/09	9:30	09/22/09	9:30	11/17/09	9:20
6												
7 Mineral Creek:												
8												
9 M34	05/19/09	9:20	06/16/09	11:00	07/14/09	10:06	08/18/09	10:15	09/22/09	10:30	11/17/09	10:20
10												
11 Cement Creek (Upsteam to Downstream):												
12												
13 CC01F					07/15/09	16:58	08/19/09	16:50	09/23/09	15:45		
14 CC01H					07/15/09	15:10	08/19/09	14:25	09/23/09	14:15		
15 CC01T					07/15/09	13:26	08/19/09	11:50	09/23/09	13:05	11/18/09	14:10
16 CCOPP-10									09/23/09	16:30	11/18/09	13:15
17 CC18B	05/19/09	14:30	06/16/09	16:05	07/14/09	13:56	08/18/09	14:05	09/22/09	15:15	11/17/09	16:00
18 CC18	05/19/09	12:25	06/16/09	13:45	07/14/09	12:00	08/18/09	12:05	09/22/09	12:30	11/17/09	14:30
19 CC48	05/19/09	10:40	06/16/09	12:45	07/14/09	11:09	08/18/09	11:15	09/22/09	11:45	11/17/09	13:15
20												
21 Cement Creek Tributaries (Upsteam to Downstream):												
22												
23 CCOPP-05			06/17/09	14:20								
24 CC-01C			06/17/09	14:00	07/15/09	16:20	08/19/09	16:30	09/23/09	15:15	11/18/09	14:40
25 CC01S					07/15/09	14:10	08/19/09	13:30	09/23/09	14:00		
26 CC02H			06/17/09	12:45								
27 CC02A			06/17/09	12:25	07/15/09	11:05	08/19/09	11:05	09/23/09	12:30		
28 CC02I					07/15/09	11:45	08/19/09	10:45	09/23/09	12:35	11/18/09	13:45
29 CC02D	05/20/09	15:30	06/17/09	12:00	07/15/09	10:15	08/19/09	9:50	09/23/09	11:50	11/18/09	12:15
30 CC02E									09/23/09	10:30	11/18/09	11:30
31 CCOPP-09									09/23/09	11:05	11/18/09	10:50
32 CC03D	05/19/09	16:46	06/17/09	10:35	07/14/09	17:18	08/18/09	18:40	09/22/09	18:20	11/18/09	9:45
33 CC07	05/19/09	14:40	06/17/09	9:35	07/14/09	14:55	08/18/09	15:00	09/22/09	16:10	11/18/09	9:20
34 CC19	05/19/09	13:00	06/16/09	15:05	07/14/09	13:07	08/18/09	13:05	09/22/09	14:25	11/17/09	15:00
35												
36 North Fork Cement Creek (Upstream to Downstream):												
37												
38 CC04	05/20/09	12:00	06/17/09	14:37	07/14/09	16:35	08/18/09	17:10	09/22/09	17:40		
39 CC07	05/19/09	14:40	06/17/09	9:35	07/14/09	14:55	08/18/09	15:00	09/22/09	16:10	11/18/09	9:20
40												
41 North Fork Cement Creek Tributary:												
42												
43 CC-06	05/20/09	10:40	06/17/09	13:50	07/14/09	15:50	08/18/09	16:03	09/22/09	17:10		
44												
45 Queen Anne Stations:												
46												
47 QA Adit											11/11/09	13:34
48 QABG-1											11/11/09	14:25
49 QABG-2											11/11/09	14:30

## ANIMAS RIVER 2009 DATA SUMMARY - Anions, TOC, DOC

Sampling Station	May 2009 F mg/L	June 2009 F mg/L	July 2009 F mg/L	Aug 2009 F mg/L	Sept 2009 F mg/L	Nov 2009 F mg/L
1						
2	<b>Animas River (Upstream to Downstream):</b>					
3						
4	A68	0.23	0.28	0.43	0.51	0.45
5	A72	<0.20	0.25	0.32	0.51	0.44
6						0.59
7	<b>Mineral Creek:</b>					
8						
9	M34	<0.20	<0.20	<0.20	0.29	0.28
10						0.57
11	<b>Cement Creek (Upstream to Downstream):</b>					
12						
13	CC01F		0.28	<0.20	<0.20	
14	CC01H		0.21	0.26	0.32	
15	CC01T		0.54	0.53	0.96	0.67
16	CCOPP-10				1.02	0.82
17	CC18B	<0.40	0.7	1.84	3.57	2.97
18	CC18	0.43	0.8	1.81	3.48	2.97
19	CC48	0.28	0.44	0.96	1.44	<0.40
20						1.21
21	<b>Cement Creek Tributaries (Upstream to Downstream):</b>					
22						
23	CCOPP-05		0.66			
24	CC-01C		<0.40	1.26	1.94	3.22
25	CC01S		1.24	1.07	2	1.5
26	CC02H		0.43			
27	CC02A		0.6	0.69	1.00	1.15
28	CC02i		0.69	0.95	1.08	1.12
29	CC02D	4.13	4.21	4.82	2.23	4.34
30	CC02E				3.64	3.66
31	CCOPP-09				3.21	2.82
32	CC03D	6.73	5.6	0.45	6.03	6.69
33	CC07	1.18	2.46	4.48	7.1	5.25
34	CC19	2.35	2.78	3.37	3.41	3.32
35						2.84
36	<b>North Fork Cement Creek (Upstream to Downstream):</b>					
37						
38	CC04	<0.40	<0.20	0.27	0.58	<0.40
39	CC07	1.18	2.46	4.48	7.1	5.25
40						4.61
41	<b>North Fork Cement Creek Tributary:</b>					
42						
43	CC06	5.73	6.78	6.18	6.66	7.2
44						
45	<b>Queen Anne Stations:</b>					
46						
47	QA Adit					
48	QABG-1					
49	QABG-2					

May 2009 Cl mg/L	June 2009 Cl mg/L	July 2009 Cl mg/L	Aug 2009 Cl mg/L	Sept 2009 Cl mg/L	Nov 2009 Cl mg/L	May 2009 SO4 mg/L	June 2009 SO4 mg/L
0.5	0.5	0.5	0.7	0.7	<0.5	29.4	45.5
<0.5	0.6	0.7	1.1	1.0	0.6	30.1	71.5
0.8	0.6	0.6	0.9	0.8	0.8	34.1	62.5
		<0.5	<0.5	<0.5			
		<0.5	<0.5	<0.5			
		<0.5	<0.5	<0.5	<0.5		
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	78.4	194
<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	99.6	243
<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	86.1	199
	<1.0						125
	<1.0	<1.0	<1.0	<1.0	<1.0		69.1
		<0.5	<0.5	<0.5			
	<1.0						85.9
	<0.5	<1.0	<0.5	<0.5			85.3
		<1.0	<1.0	<0.5	<0.5		
<1.0	<2.0	<1.0	<0.5	<1.0	<1.0	588	634
				<0.5	<0.5		
				<0.5	<0.5		
<0.5	<2.5	<0.5	<1.0	<0.5	<0.5	1370	1150
<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	322	621
<1.0	<2.5	0.5	0.5	0.5	<0.5	1590	1470
<1.0	<0.5	<0.5	<1.0	<1.0		32.8	59.2
<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	322	621
<1.0	<2.5	<1.0	<1.0	<1.0		2020	1330

July 2009 SO4 mg/L	Aug 2009 SO4 mg/L	Sept 2009 SO4 mg/L	Nov 2009 SO4 mg/L	May 2009 TOC mg/L	June 2009 TOC mg/L	July 2009 TOC mg/L	Aug 2009 TOC mg/L
58.6	107	112	141	0.81	0.59	<0.50	<0.50
99	214	198	163	1.38	0.65	<0.50	<0.50
82.6	191	167	252	1.13	0.68	<0.50	<0.50
100	155	133				<0.50	<0.50
93.5	113	122				<0.50	<0.50
131	144	187	146			<0.50	<0.50
		190	160				
389	388	696	618	1.32	<0.50	<0.50	<0.50
428	917	748	707	<0.50	<0.50	<0.50	0.5
279	534	507	450	1.3	0.66	<0.50	<0.50
					<0.50		
184	313	496	154		<0.50	<0.50	<0.50
165	189	258			<0.50	<0.50	<0.50
					<0.50		
104	161	172			<0.50	<0.50	<0.50
103	150	168	193			<0.50	<0.50
710	741	703	758	<0.50	<0.50	<0.50	<0.50
		350	391				
		144	133				
68.2	1400	1370	1460	<0.50	<0.50	<0.50	<0.50
1080	1460	1300	1320	<0.50	<0.50	<0.50	<0.50
1760	1790	1670	1390	<0.50	<0.50	<0.50	<0.50
121	143	144		<0.50	<0.50	<0.50	<0.50
1080	1460	1300	1320	<0.50	<0.50	<0.50	<0.50
1590	1600	1410		<0.50	<0.50	<0.50	<0.50

Sept 2009 TOC mg/L	Nov 2009 TOC mg/L	May 2009 DOC mg/L	June 2009 DOC mg/L	July 2009 DOC mg/L	Aug 2009 DOC mg/L	Sept 2009 DOC mg/L	Nov 2009 DOC mg/L
<0.50		0.78	0.67	<0.50	0.54	<0.50	
<0.50		1.33	<0.50	<0.50	0.89	<0.50	
<0.50		1.03	0.58	<0.50	0.51	<0.50	
<0.50				<0.50	<0.50	0.68	
<0.50				<0.50	<0.50	<0.50	
<0.50				<0.50	<0.50	<0.50	
<0.50						<0.50	
0.54		1.04	<0.50	<0.50	0.55	0.5	
0.71		0.57	<0.50	<0.50	0.63	<0.50	
<0.50		0.87	0.65	<0.50	<0.50	<0.50	
			<0.50				
0.51			<0.50	<0.50	<0.50	<0.50	
<0.50			<0.50	<0.50	<0.50	<0.50	
			<0.50				
<0.50			<0.50	<0.50	<0.50	<0.50	
<0.50			<0.50	<0.50	<0.50	<0.50	
<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	
<0.50			<0.50	<0.50	<0.50	<0.50	
<0.50		<0.50	0.52	<0.50	0.52	<0.50	
0.86		<0.50	0.69	<0.50	0.55	0.5	
<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	
<0.50		<0.50	0.58	<0.50	0.57	<0.50	
0.86		<0.50	0.69	<0.50	0.55	0.5	
<0.50		0.56	<0.50	<0.50	0.58	<0.50	

Tables 1 of 3 only  
Schroeder's Tables  
Sample Location Name Changes



# September 2010 Animas River Sampling Locations:

*incorporate into SAP*

Sampling Location	Stakeholder Location	Latitude	Longitude	Elevation (HAE)	Description:
<b>Animas River (Upstream to Downstream):</b>					
A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.
<b>Mineral Creek:</b>					
M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
<b>Cement Creek (Upstream to Downstream):</b>					
CC01F		37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.
CC01H		37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
CC01T		37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
CC-01U		37 54 38.67 N	107 38 05.47 W	11628	Cement Creek downstream of the Sublevel 1 tributaries. Sample just upstream of the road crossing. Site was first sampled and named CCOPP-10 during the September 2009 sampling event. Name was changed for the June 2010 event.
CCOPP-12		37 53 52.00 N	107 38 45.33 W	10734	Cement Creek immediately upstream of Red and Bonita confluence. Site is straight across from a power pole. New site for June 2010 - will be renamed.
CCOPP-11		37 53 43.94 N	107 38 49.22 W	10655	Cement Creek downstream of the Red and Bonita confluence and upstream of the North Fork confluence. Access site just upstream of the road crossing at the North Fork. New site for June 2010 - will be renamed.
CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
CC-18	CC18	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.
<b>Cement Creek Tributaries (Upstream to Downstream):</b>					
CC01C2		Get GPS if you add this site.			Grand Mogul Opportunity sample. Sample if needed.
CC01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
CC01S		37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.
CC02i	CC02i	37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CC02a and CC02h. Site was called CCOPP-03A prior to August 2009 sampling event.
CC02D	CC02D	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.

CC02J		37 54 33.44 N	107 38 16.11 W	11401	Plugged adit with pipe located between Mogul and Gold Point; historically dry; however it was flowing during June 15, 2010 site recon. Site is 100 yards southeast of Mogul.
CC02E		37 54 29.63 N	107 38 18.32 W	11429	Gold Point Mine adit at portal. This is the first adit downstream of the Mogul Mine that flows out of the ground up the hill on the right side of the road when heading upstream toward the Mogul. There is no mine tunnel here - water comes out of the ground through rocks.
CC02K		37 54 26.99 N	107 38 24.81 W	11282	Pride of Bonita adit at portal. Open draining adit just uphill from the road that is accessed near a rock outcropping. It is just downstream of CC02E and flows out of the ground from an open tunnel. Site was named CCOPP-09 during the September 09 sampling event and was renamed for the June 2010 event.
MTD-4		37 54 31.54 N	107 38 30.31 W	11140	Mogul tailings drainage just upstream of confluence with Cement Creek. Site is upstream along Cement Creek from FD-1.
FD-1		37 54 31.28 N	107 38 31.55 W	11130	Fenn drainage upstream of confluence with Cement Creek. Site is near MTD-4 but downstream along Cement Creek.
CC03C			Get GPS!!		Red and Bonita mine adit at the portal. Do not take flow measurements at this site.
CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.
<b>North Fork Cement Creek (Upstream to Downstream):</b>					
CC04	CC04	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.
<b>North Fork Cement Creek Tributary:</b>					
CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)										
A72		37 47 24.21 = 37.7919	107 40 03.30 = 107.6833	9155	Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37 48 09.72 = 37.8028	107 40 21.77 = 107.6722	9208	Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37 48 40.34 = 37.8111	107 39 33.32 = 107.6586	9248	14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream)										
CC48	323, 09358550	37 49 04.07 = 37.8200	107 39 42.49 = 107.6631	9304	Cement Creek gauging station	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18	CCOPP-01	37 53 28.57 = 37.8913	107 38 57.07 = 107.6492	10514	CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	37 53 27.50 = 37.8910	107 38 54.39 = 107.6484	10540	<u>American Tunnel</u> @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

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<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC18B	CC18	37 53 39.20	107 38 50.08	10661	Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTSW11; CC-12	37 53 42.34	107 38 48.30	10671	N Fork above CC confl. immmed. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation)	37 53 40.50	107 38 18.09	11386	<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC04	CCOPP-02	37 53 38.82	107 38 15.42	11313	NF CC just upstrm of 7level adit flow downhill	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	37 53 48.46	107 38 41.61	10776	<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C	Access NOT granted	37.8972	107.6439		<u>Red &amp; Bonita</u> – Portal discharge	Yes	Yes – needs verified	Yes	Yes	

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
✓ CC02K		37 54 26.99	107 38 24.81	11282	Open draining tunnel uphill from the road; accessed near rock outcropping; just downstream of CC02E. Site was named CCOPP-09 during the September 09 sampling event. This name will be changed.	If applicable	If applicable	If applicable	If applicable	Yes
✓ CC02E		37 54 29.63	107 38 18.32	11429	Gold Point adit - from ground (caved)	Yes	Yes - needs 1 <sup>st</sup> time collection	Yes	Yes	
CC02J	Get this data although dry	Ask WCS	Ask WCS	Ask WCS	<u>Small adit betw CC02E and CC02D</u>	Yes	Yes - needs 1 <sup>st</sup> time collection	Yes	Yes	
✓ CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.54 36.14 (UOS 37.9098)	107.38 17.26 (UOS 107.6384)	11358.00 (WCS Chk 11376)	<u>Mogul</u> - @ flume	Yes	Yes - needs verified	Yes	Yes	
✓ CC02A	CCOPP-03	37 54 38.54	107 37 02.60	11603	<u>Mogul Sublevel 1</u> - right drainage	Yes	Yes - needs verified	Yes	Yes	

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					base of tails/ waste pile					
✓ CC01U		37 54 38.67	107 38 05.47	11628	Cement Creek dwnstrm of QA Sblvl 1 tribs. Sample just upstrm of road crossing. Site was first sampled during the Sept 2009 event. Site will be renamed.	If applicable	If applicable	If applicable	If applicable	Yes
✓ CC02H	CCOPP-04	37 54 38.47	107 38 02.73	11604	<u>Mogul Sublevel</u> <u>1</u> - left drainage base of tails/ waste pile	Yes	Yes - needs verified	Yes	Yes	
✓ CC02i	CCOPP-03A	37 54 38.41	107 38 04.05	11590	<u>Combined flow</u> <u>from CC02A</u> <u>and CC02H</u>	Yes	Yes - needs verified	Yes	Yes	
✓ CC01S	QA-0	37 54 36.84	107 37 59.33	11622	<u>Queen Anne -</u> tributary just upstrm of Cement Creek	Yes	Yes - needs verified	Yes	Yes	

<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
✓ CC01T	CCOPP-06	37 54 36.81	107 38 00.90	11617	<u>Cement Creek</u> – just dwnstrm of QA trib & upstrm of sublevel 1 trib	Yes	Yes – needs verified	Yes	Yes	
✓ CC01H	CCOPP-07	37 54 36.61	107 37 59.28	11621	<u>Cement Creek</u> – upnstrm of QA trib & dwnstrm of Grd Mogul discharge – make sure mixed!	Yes	Yes – needs verified	Yes	Yes	
✓ CC01F	CCOPP-08	37 54 33.64	107 37 47.46	11781	<u>Cement Creek</u> upstream of Grand Mogul collapsed adit and waste rock	Yes	Yes – needs verified	Yes	Yes	
✓ CC01C	UOS-GTSW10	37 54 35.72	107 37 51.66	11682	<u>Grand Mogul</u> – collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
✓ CC01C1		37 54 35.78	107 37 51.54	Ask WCS	<u>Grand Mogul</u> – North seep (strm right) @ toe	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-11						If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-12						If applicable	If applicable	If applicable	If applicable	Yes
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	
CC-FILT-					Filter Blank				Yes– for dissolved	

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01					QA/QC				fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
<b>Total Samples</b>								<b>21</b>	<b>23</b>	<b>To be determined</b>



<b>Table 2: Field Parameters to collect at surface water sample locations</b>						
<b>Parameter, units</b>	<b>Method</b>	<b>Reporting Limit *</b>	<b>Adjacent Measurement Accuracy Goals</b>	<b>Holding Time</b>	<b>EPA Method Number</b>	<b>Container type</b>
Temperature, °C	Hydrolab or YSI Multimeter Probe	0.1 °C	0.5 °C	Field analysis	EPA 170.1	In situ or field container
Specific Conductance, $\mu$ Siemens/cm	Hydrolab or YSI Multimeter Probe	1 $\mu$ S/cm	15%	Field analysis	EPA 120.1	In situ or field container
pH, standard units (s.u.)	Hydrolab or YSI Multimeter Probe	0.01 s.u.	0.5 s.u.	Field analysis	EPA 150.1	In situ or field container
Dissolved oxygen	Hydrolab or YSI Multimeter Probe	0.0 mg/l	+/- 0.7 mg/l	Field analysis	EPA 360.1	In situ or field container
Flow, cubic feet/second (cfs)	Marsh McBirney or StreamPro ADCP" Doppler	0.7 cfs	10% rule	Field analysis	EPA R8 SOP 722	NA

**Note: As of May 2009, ORP removed from SAP requirements due to continual issues with ORP meter.**  
**EPA Region 8 Laboratory Standard Operating Procedure (SOP) 720 and SOP 722**  
**Field Sampling Protocols and Field Flow Measurements**

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO4)	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC & DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H3PO4, pH < 2 (can use HCl or H2SO4 also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	HNO <sub>3</sub> , pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO <sub>3</sub> , pH < 2	250 mL LDPE

Notes: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab that START3 is procuring.

As of November 2009, TOC and DOC dropped due to lack of detections during four previous months of collection.

**Table 4: EPA Region 8 Inorganic (Metals) Reporting Limits for Water Samples**

	ICP-OE EPA Method 200.7	ICP-MS EPA Method 200.8	Historic ARSG RLs
Element	ug/L	ug/L	ug/L
Aluminum	100	NA	20
Antimony	NA	1	2
Arsenic	NA	4	1
Barium	4	0.3	0.5
Beryllium	1	NA	0.2
Boron	100	NA	NA
Cadmium	1	0.2	0.2
Calcium	100**	NA	100**
Chromium	2	NA	5
Cobalt	2	NA	2
Copper	10	3	0.8
Iron	100	NA	5
Lead	10	1	0.5
Magnesium	50**	NA	50**
Manganese	2	NA	0.5
Molybdenum	4	NA	0.5
Nickel	2	1	0.3
Potassium	1000**	NA	1000**
Selenium	NA	1	1
Silica	400	NA	200
Silver	8	0.5	0.3
Sodium	500**	NA	500**
Strontium	2	NA	3
Thallium	NA	0.3	20
Titanium	5	NA	5
Vanadium	10	NA	10
Zinc	40	5	4
Hardness (mg/l)**	Calculated from dissolved Ca and Mg		0.2 mg/l
NA = Not applicable			
*Reporting limits for metals vary depending due to variations in sample matrix and individual laboratory abilities. The reporting limits listed above will be used as guidelines and attempts will be made to have these limits met as nearly as feasible.			
** From dissolved fraction			

**Table 5: Reporting Limits Compared to Applicable Water Quality Standards for Animas River Segment 7 and 4a -(Metal concentrations for Dissolved Metals Unless Otherwise Noted by TRec)**

	Region 8 Reporting Limits	Stream Segment 7 (Acute)*	Stream Segment 7 (Chronic)	Stream Segment 4a (Acute)	Stream Segment 4a (Chronic)
Element	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (700-3550)	Monthly Standards [2523 (TRec)]
Arsenic	4	--	100 (TRec)	340	--100 (TRec)
Beryllium	1	--	100 (TRec)	--	--
Cadmium	0.2	To Maintain and Achieve WQS at Segments 4a and 4b	10 (TRec)	TVS 3.1 (trout)	TVS [2.5]
Calcium	100**	--	--	--	--
Chromium III	2	--	100 (TRec)	TVS 1005	TVS 130
Chromium VI	2	--	100 (TRec)	TVS 16	TVS 11
Copper	3	To Maintain and Achieve WQS at Segments 4a and 4b	200 (TRec)	TVS 25.9	TVS [20]
Iron	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (1220 – 3776)	Monthly Standards [4204 (TRec)]
Lead	1	To Maintain and Achieve WQS at Segments 4a and 4b	100 (TRec)	TVS 140	TVS 5
Magnesium	50**	--	--	--	--
Manganese	2	To Maintain and Achieve WQS at Segments 4a and 4b	--	TVS 3700	TVS 2100
Nickel	1	--	200 (TRec)	TVS 842	TVS 93
Selenium	1	--	20 (TRec)	TVS 18.4	TVS 46
Silver	0.5	--	--	TVS 6.7	TVS 0.25 (trout)
Zinc	40	To Maintain and Achieve WQS at Segments 4a and 4b	2000 (TRec)	Monthly Standards (170 – 620)	Monthly Standards [730]
pH		3.7 -9.0		--	Monthly Standards [Existing Quality 5.9 – 9.0]

Notes:

-- Not applicable or not a Contaminant of Concern

\* Animas River Stream Segment 7 is Cement Creek and its tributaries. Segment 7 has a temporary modification to existing quality for all metals.

\*\* From dissolved fraction

[ ] Temporary Modifications for Segment 4a, beginning at TMDL compliance point A72

TRec Total Recoverable TVS Table Value Standards (Hardness of 200 ug/L assumed)

WQS Water Quality Standards

Sources: ARSG Bill Simon; Colorado Water Quality Control Commission Regulation 31; and Colorado Code of Regulations 5CCR 1002 Regulation 34: "Classification and Numeric Standards for San Juan River and Dolores River Basins;" and UOS 2006.

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)										
A72		37 47 24.21 = 37.7919	107 40 03.30 = 107.6833	9155	Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37 48 09.72 = 37.8028	107 40 21.77 = 107.6722	9208	Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37 48 40.34 = 37.8111	107 39 33.32 = 107.6586	9248	14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream)										
CC48	323, 09358550	37 49 04.07 = 37.8200	107 39 42.49 = 107.6631	9304	Cement Creek gauging station	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18	CCOPP-01	37 53 28.57 = 37.8913	107 38 57.07 = 107.6492	10514	CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	37 53 27.50 = 37.8910	107 38 54.39 = 107.6484	10540	<u>American Tunnel</u> @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18B	CC18	37 53 39.20	107 38 50.08	10661	Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTSW11; CC-12	37 53 42.34	107 38 48.30	10671	N Fork above CC confl. immmed. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation)	37 53 40.50	107 38 18.09	11386	<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC04	CCOPP-02	37 53 38.82	107 38 15.42	11313	NF CC just upstrm of 7level adit flow downhill	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	3753 48.46	107 38 41.61	10776	<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C	Access NOT granted	37.8972	107.6439		<u>Red &amp; Bonita</u> – Portal discharge	Yes	Yes – needs verified	Yes	Yes	

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
<del>CC-OPP-09</del> CC02K		37 54 26.99	107 38 24.81	11282	Open draining tunnel uphill from the road; accessed near rock outcropping; just downstream of CC02E. Site was named CCOPP-09 during the September 09 sampling event. This name will be changed.	If applicable	If applicable	If applicable	If applicable	Yes
CC02E		37 54 29.63	107 38 18.32	11429	Gold Point adit - from ground (caved)	Yes	Yes - needs 1 <sup>st</sup> time collection	Yes	Yes	
CC02J	Get this data although dry	Ask WCS	Ask WCS	Ask WCS	Small adit betw CC02E and CC02D	Yes	Yes - needs 1 <sup>st</sup> time collection	Yes	Yes	
CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.54 36.14 (UOS 37.9098)	107.38 17.26 (UOS 107.6384)	11358.00 (WCS Chk 11376)	Mogul - @ flume	Yes	Yes - needs verified	Yes	Yes	
CC02A	CCOPP-03	37 54 38.54	107 37 02.60	11603	Mogul Sublevel 1 - right drainage	Yes	Yes - needs verified	Yes	Yes	

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					base of tails/ waste pile					
CC-OPP- 10 ↓ CC01U		37 54 38.67	107 38 05.47	11628	Cement Creek downstrm of QA Sblvl 1 tribs. Sample just upstrm of road crossing. Site was first sampled during the Sept 2009 event. Site will be renamed.	If applicable	If applicable	If applicable	If applicable	Yes
CC02H	CCOPP-04	37 54 38.47	107 38 02.73	11604	<u>Mogul Sublevel 1</u> - left drainage base of tails/ waste pile	Yes	Yes - needs verified	Yes	Yes	
CC02i	CCOPP-03A	37 54 38.41	107 38 04.05	11590	<u>Combined flow from CC02A and CC02H</u>	Yes	Yes - needs verified	Yes	Yes	
CC01S	QA-0	37 54 36.84	107 37 59.33	11622	<u>Queen Anne</u> - tributary just upstrm of Cement Creek	Yes	Yes - needs verified	Yes	Yes	

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Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC01T	CCOPP-06	37 54 36.81	107 38 00.90	11617	<u>Cement Creek</u> – just dwnstrm of QA trib & upstrm of sublevel 1 trib	Yes	Yes – needs verified	Yes	Yes	
CC01H	CCOPP-07	37 54 36.61	107 37 59.28	11621	<u>Cement Creek</u> – upnstrm of QA trib & dwnstrm of Grd Mogul discharge – make sure mixed!	Yes	Yes – needs verified	Yes	Yes	
CC01F	CCOPP-08	37 54 33.64	107 37 47.46	11781	<u>Cement Creek</u> upstream of Grand Mogul collapsed adit and waste rock	Yes	Yes – needs verified	Yes	Yes	
CC01C	UOS-GTSW10	37 54 35.72	107 37 51.66	11682	<u>Grand Mogul</u> – collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
<del>CC-OPP-05</del> CC01C		37 54 35.78	107 37 51.54	Ask WCS	<u>Grand Mogul</u> – North seep (strm right) @ toe	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-11						If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-12						If applicable	If applicable	If applicable	If applicable	Yes
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	
CC-FILT-					Filter Blank				Yes– for dissolved	

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01					QA/QC				fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
<b>Total Samples</b>								<b>21</b>	<b>23</b>	<b>To be determined</b>

Table 2: Field Parameters to collect at surface water sample locations						
Parameter, units	Method	Reporting Limit *	Adjacent Measurement Accuracy Goals	Holding Time	EPA Method Number	Container type
Temperature, °C	Hydrolab or YSI Multimeter Probe	0.1 °C	0.5 °C	Field analysis	EPA 170.1	In situ or field container
Specific Conductance, $\mu$ Siemens/cm	Hydrolab or YSI Multimeter Probe	1 $\mu$ S/cm	15%	Field analysis	EPA 120.1	In situ or field container
pH, standard units (s.u.)	Hydrolab or YSI Multimeter Probe	0.01 s.u.	0.5 s.u.	Field analysis	EPA 150.1	In situ or field container
Dissolved oxygen	Hydrolab or YSI Multimeter Probe	0.0 mg/l	+/- 0.7 mg/l	Field analysis	EPA 360.1	In situ or field container
Flow, cubic feet/second (cfs)	Marsh McBirney or StreamPro ADCP" Doppler	0.7 cfs	10% rule	Field analysis	EPA R8 SOP 722	NA

**Note: As of May 2009, ORP removed from SAP requirements due to continual issues with ORP meter.**  
**EPA Region 8 Laboratory Standard Operating Procedure (SOP) 720 and SOP 722**  
**Field Sampling Protocols and Field Flow Measurements**

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO4)	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC & DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H <sub>3</sub> PO <sub>4</sub> , pH < 2 (can use HCl or H <sub>2</sub> SO <sub>4</sub> also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201 ICP-MS and 210-optima	180 days	HNO <sub>3</sub> , pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201 ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO <sub>3</sub> , pH < 2	250 mL LDPE

Notes: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab that START3 is procuring.

As of November 2009, TOC and DOC dropped due to lack of detections during four previous months of collection.

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**Table 4: EPA Region 8 Inorganic (Metals) Reporting Limits for Water Samples**

	ICP-OE EPA Method 200.7	ICP-MS EPA Method 200.8	Historic ARSG RLs
Element	ug/L	ug/L	ug/L
Aluminum	100	NA	20
Antimony	NA	1	2
Arsenic	NA	4	1
Barium	4	0.3	0.5
Beryllium	1	NA	0.2
Boron	100	NA	NA
Cadmium	1	0.2	0.2
Calcium	100**	NA	100**
Chromium	2	NA	5
Cobalt	2	NA	2
Copper	10	3	0.8
Iron	100	NA	5
Lead	10	1	0.5
Magnesium	50**	NA	50**
Manganese	2	NA	0.5
Molybdenum	4	NA	0.5
Nickel	2	1	0.3
Potassium	1000**	NA	1000**
Selenium	NA	1	1
Silica	400	NA	200
Silver	8	0.5	0.3
Sodium	500**	NA	500**
Strontium	2	NA	3
Thallium	NA	0.3	20
Titanium	5	NA	5
Vanadium	10	NA	10
Zinc	40	5	4
Hardness (mg/l)**	Calculated from dissolved Ca and Mg		0.2 mg/l
NA = Not applicable			
*Reporting limits for metals vary depending due to variations in sample matrix and individual laboratory abilities. The reporting limits listed above will be used as guidelines and attempts will be made to have these limits met as nearly as feasible.			
** From dissolved fraction			

**Table 5: Reporting Limits Compared to Applicable Water Quality Standards for Animas River Segment 7 and 4a -(Metal concentrations for Dissolved Metals Unless Otherwise Noted by TRec)**

	Region 8 Reporting Limits	Stream Segment 7 (Acute)*	Stream Segment 7 (Chronic)	Stream Segment 4a (Acute)	Stream Segment 4a (Chronic)
Element	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (700-3550)	Monthly Standards [2523 (TRec)]
Arsenic	4	--	100 (TRec)	340	--100 (TRec)
Beryllium	1	--	100 (TRec)	--	--
Cadmium	0.2	To Maintain and Achieve WQS at Segments 4a and 4b	10 (TRec)	TVS 3.1 (trout)	TVS [2.5]
Calcium	100**	--	--	--	--
Chromium III	2	--	100 (TRec)	TVS 1005	TVS 130
Chromium VI	2	--	100 (TRec)	TVS 16	TVS 11
Copper	3	To Maintain and Achieve WQS at Segments 4a and 4b	200 (TRec)	TVS 25.9	TVS [20]
Iron	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (1220 – 3776)	Monthly Standards [4204 (TRec)]
Lead	1	To Maintain and Achieve WQS at Segments 4a and 4b	100 (TRec)	TVS 140	TVS 5
Magnesium	50**	--	--	--	--
Manganese	2	To Maintain and Achieve WQS at Segments 4a and 4b	--	TVS 3700	TVS 2100
Nickel	1	--	200 (TRec)	TVS 842	TVS 93
Selenium	1	--	20 (TRec)	TVS 18.4	TVS 46
Silver	0.5	--	--	TVS 6.7	TVS 0.25 (trout)
Zinc	40	To Maintain and Achieve WQS at Segments 4a and 4b	2000 (TRec)	Monthly Standards (170 – 620)	Monthly Standards [730]
pH		3.7 -9.0		--	Monthly Standards [Existing Quality 5.9 – 9.0]

## Notes:

-- Not applicable or not a Contaminant of Concern

\* Animas River Stream Segment 7 is Cement Creek and its tributaries. Segment 7 has a temporary modification to existing quality for all metals.

\*\* From dissolved fraction

[ ] Temporary Modifications for Segment 4a, beginning at TMDL compliance point A72

TRec Total Recoverable

TVS Table Value Standards (Hardness of 200 ug/L assumed)

WQS Water Quality Standards

Sources: ARSG Bill Simon; Colorado Water Quality Control Commission Regulation 31; and Colorado Code of Regulations 5CCR 1002 Regulation 34: "Classification and Numeric Standards for San Juan River and Dolores River Basins;" and UOS 2006.

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## 2009 Animas River Sampling Locations:

Sampling Location	Stakeholder Location	Latitude	Longitude	Elevation (HAE)	Description:
<b>Animas River (Upstream to Downstream):</b>					
A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.
<b>Mineral Creek:</b>					
M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
<b>Cement Creek (Upstream to Downstream):</b>					
CC01F		37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.
CC01H		37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
CC01T		37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
CC01U		37 54 38.67 N	107 38 05.47 W	11628	Cement Creek downstream of the Sublevel 1 tributaries. Sample just upstream of the road crossing. Site was first sampled and named CCOPP-10 during the September 2009 sampling event. Name was changed for the June 2010 event.
CCOPP-12	Have GPS - needs diff. correction				Cement Creek immediately upstream of Red and Bonita confluence. Site is straight across from a power pole. New site for June 2010 - will be renamed.
CCOPP-11	Have GPS - needs diff. correction				Cement Creek downstream of the Red and Bonita confluence and upstream of the North Fork confluence. Access site just upstream of the road crossing at the North Fork. New site for June 2010 - will be renamed
CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #777 on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
CC-18	CC18	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.
<b>Cement Creek Tributaries (Upstream to Downstream):</b>					
CC01C1		37 54 35.78 N	107 37 51.54 W		Grand Mogul north seep (stream right) at source. GPS provided by Sabrina. Site was named CCOPP-05 but was renamed for the June 2010 event.
CC01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
CC01S		37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.
CC02H	CC02h	37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009. Site was called CCOPP-04 during previous sampling events.
CC02A	CC02a	37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July, August, and September 2009 sampling events. Site was called CCOPP-03 prior to August 2009 sampling event.



CC02i	CC02i	37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CC02a and CC02h. Site was called CCOPP-03A prior to August 2009 sampling event.
CC02D	CC02D	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
CC02J		get from Schroeder or START	get from Schroeder or START		Plugged adit with pipe located between Mogul and Gold Point; historically dry; however it was flowing during June 15, 2010 site recon.
CC02E		37 54 29.63 N	107 38 18.32 W	11429	Gold Point Mine adit at portal. This is the first adit downstream of the Mogul Mine that flows out of the ground up the hill on the right side of the road when heading upstream toward the Mogul. There is no mine tunnel here - water comes out of the ground through rocks.
CC02K		37 54 26.99 N	107 38 24.81 W	11282	Pride of Bonita adit at portal. Open draining adit just uphill from the road that is accessed near a rock outcropping. It is just downstream of CC02E and flows out of the ground from an open tunnel. Site was named CCOPP-09 during the September 09 sampling event and was renamed for the June 2010 event.
CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.
<b>North Fork Cement Creek (Upstream to Downstream):</b>					
CC04	CC04	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.
CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
<b>North Fork Cement Creek Tributary:</b>					
CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
<b>* Queen Anne Stations:</b>					
QA Adit		37 54 54.7 N	107 37 42.1 W		Queen Anne adit at the portal.
QABG-1		37 54 52.1 N	107 37 47.3 W		Queen Anne background sample #1.
QABG-2		37 54 52.1 N	107 37 45.8 W		Queen Anne background sample #2.
<b>Mogul Tailings Drainage Stations:</b>					
MTD-1	Have GPS - needs diff. correction				Left seep (when looking downstream) coming out of the base of the Mogul tailings. Water comes out in two areas. Sample downstream of their confluence.
MTD-2	Have GPS - needs diff. correction				Right seep coming out of the base of the Mogul tailings.
MTD-3	Have GPS - needs diff. correction				Main channel of Mogul Tailings Drainage where all flows come together. Sample downstream of the mixing zone and before flow reaches the wetland.

\* NOTE: Queen Anne sites were sampled once by Lisa Richardson (BOR) in November 2009. GPS readings were taken by her.

## 2009 Animas River Sampling Locations:

Sampling Location	Stakeholder Location	Latitude	Longitude	Elevation (HAE)	Description:
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## Animas River (Upstream to Downstream):

✓ A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
✓ A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.

## Mineral Creek:

✓ M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
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## Cement Creek (Upstream to Downstream):

✓ CC01F		37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.
✓ CC01H		37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
✓ CC01T		37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
✓ <del>CCOPP-10</del> CC01U		37 54 38.67 N	107 38 05.47 W	11628	Cement Creek downstream of the Sublevel 1 tributaries. Sample just upstream of the road crossing. Site was first sampled and named CCOPP-10 during the September 2009 sampling event. Site will be renamed.
✓ CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
✓ CC-18	CC18	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
✓ CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.

## Cement Creek Tributaries (Upstream to Downstream):

✓ <del>CCOPP-05</del> CC01C1		37 54 35.78 N	107 37 51.54 W		Grand Mogul north seep (stream right) at source. GPS provided by Sabrina.
✓ CC-01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
✓ CC01S		37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.

✓ CC02H	CC02h	37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009. Site was called CCOPP-04 during previous sampling events.
✓ CC02A	CC02a	37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July, August, and September 2009 sampling events. Site was called CCOPP-03 prior to August 2009 sampling event.
✓ CC02i	CC02i	37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CC02a and CC02h. Site was called CCOPP-03A prior to August 2009 sampling event.
✓ CC02D	CC02D	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
✓ CC02E		37 54 29.63 N	107 38 18.32 W	11429	Gold Point Mine adit at portal. This is the first adit downstream of the Mogul Mine that flows out of the ground up the hill on the right side of the road when heading upstream toward the Mogul. There is no mine tunnel here - water comes out of the ground through rocks.
✓ <del>CCOPP-09</del> CC02K		37 54 26.99 N	107 38 24.81 W	11282	Open draining adit just uphill from the road that is accessed near a rock outcropping. It is just downstream of CC02E and flows out of the ground from an open tunnel. Site was named CCOPP-09 during the September 09 sampling event. This name will be changed.
✓ CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
✓ CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
✓ CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.

North Fork Cement Creek (Upstream to Downstream):

✓ CC04	CC04	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.
✓ CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.

North Fork Cement Creek Tributary:

✓ CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
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\* Queen Anne Stations:

QA Adit	37 54 54.7 N	107 37 42.1 W	Queen Anne adit at the portal.
QABG-1	37 54 52.1 N	107 37 47.3 W	Queen Anne background sample #1.
QABG-2	37 54 52.1 N	107 37 45.8 W	Queen Anne background sample #2.

\* NOTE: Queen Anne sites were sampled once by Lisa Richardson (BOR) in November 2009. GPS readings were taken by her.

CC02 J - small adit between CC02E (Gold Point) and CC02D (Mogul)

Data Mgmt - Holly McComb  
Scribe →

## 2009 Animas River Sampling Locations:

Sampling Location	Stakeholder Location	Latitude	Longitude	Elevation (HAE)	Description:
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## Animas River (Upstream to Downstream):

A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.

## Mineral Creek:

M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
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## Cement Creek (Upstream to Downstream):

CC01F		37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.
CC01H		37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
CC01T		37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
CCOPP-10		37 54 38.67 N	107 38 05.47 W	11628	Cement Creek downstream of the Sublevel 1 tributaries. Sample just upstream of the road crossing. Site was first sampled and named CCOPP-10 during the September 2009 sampling event. Site will be renamed.
CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
CC-18	CC18	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.

## Cement Creek Tributaries (Upstream to Downstream):

CCOPP-05		37 54 35.78 N	107 37 51.54 W		Grand Mogul north seep (stream right) at source. GPS provided by Sabrina.
CC-01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
CC01S		37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.

no data or posters - keep as reminder.

CC02H	CC02h	37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009. Site was called CCOPP-04 during previous sampling events.
CC02A	CC02a	37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July, August, and September 2009 sampling events. Site was called CCOPP-03 prior to August 2009 sampling event.
CC02i	CC02i	37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CC02a and CC02h. Site was called CCOPP-03A prior to August 2009 sampling event.
CC02D	CC02D	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
CC02E		37 54 29.63 N	107 38 18.32 W	11429	Gold Point Mine adit at portal. This is the first adit downstream of the Mogul Mine that flows out of the ground up the hill on the right side of the road when heading upstream toward the Mogul. There is no mine tunnel here - water comes out of the ground through rocks.
CCOPP-09		37 54 26.99 N	107 38 24.81 W	11282	Open draining adit just uphill from the road that is accessed near a rock outcropping. It is just downstream of CC02E and flows out of the ground from an open tunnel. Site was named CCOPP-09 during the September 09 sampling event. This name will be changed.
CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.

**North Fork Cement Creek (Upstream to Downstream):**

CC04	CC04	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.
CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.

**North Fork Cement Creek Tributary:**

CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
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**\* Queen Anne Stations:**

QA Adit	37 54 54.7 N	107 37 42.1 W	Queen Anne adit at the portal.
QABG-1	37 54 52.1 N	107 37 47.3 W	Queen Anne background sample #1.
QABG-2	37 54 52.1 N	107 37 45.8 W	Queen Anne background sample #2.

\* NOTE: Queen Anne sites were sampled once by Lisa Richardson (BOR) in November 2009. GPS readings were taken by her.

## 2009 Animas River Sampling Locations:

Sampling Location	Stakeholder Location	Latitude	Longitude	Elevation (HAE)	Description:
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### Animas River (Upstream to Downstream):

A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.

### Mineral Creek:

M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
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### Cement Creek (Upstream to Downstream):

CC01F		37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.
CC01H		37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
CC01T		37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
CCOPP-10		37 54 38.67 N	107 38 05.47 W	11628	Cement Creek downstream of the Sublevel 1 tributaries. Sample just upstream of the road crossing. Site was first sampled and named CCOPP-10 during the September 2009 sampling event. Site will be renamed.
CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
CC-18	CC18	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.

### Cement Creek Tributaries (Upstream to Downstream):

CCOPP-05		37 54 35.78 N	107 37 51.54 W		Grand Mogul north seep (stream right) at source. GPS provided by Sabrina.
CC-01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
CC01S		37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.
CC02H	CC02h	37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009. Site was called CCOPP-04 during previous sampling events.
CC02A	CC02a	37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July, August, and September 2009 sampling events. Site was called CCOPP-03 prior to August 2009 sampling event.

CC02J missing from map

✓	CC02i	CC02i	37 54 38 41 N	107 38 04 05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CC02a and CC02h. Site was called CCOPP-03A prior to August 2009 sampling event.
✓	CC02D	CC02D	37 54 36 14 N	107 38 17 26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
✓	CC02E		37 54 29.63 N	107 38 18.32 W	11429	Gold Point Mine adit at portal. This is the first adit downstream of the Mogul Mine that flows out of the ground up the hill on the right side of the road when heading upstream toward the Mogul. There is no mine tunnel here - water comes out of the ground through rocks.
✓	CCOPP-09		37 54 26.99 N	107 38 24.81 W	11282	Open draining adit just uphill from the road that is accessed near a rock outcropping. It is just downstream of CC02E and flows out of the ground from an open tunnel. Site was named CCOPP-09 during the September 09 sampling event. This name will be changed.
✓	CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
✓	CC07	CC07	37 53 42.34 N	107 38 48 30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
✓	CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.

**North Fork Cement Creek (Upstream to Downstream):**

✓	CC04	CC04	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.
✓	CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.

**North Fork Cement Creek Tributary:**

✓	CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
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## 2009 Animas River Sampling Locations:

Sampling Location	Stakeholder Location	William Simon Comments	Latitude	Longitude	Elevation (HAE)	Description:
<b>Animas River:</b>						
A72	A72		37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.
A68	A68		37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
<b>Mineral Creek:</b>						
M34	M34		37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
<b>Cement Creek:</b>						
CC48	CC48		37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.
CCOPP-01	CC20?	this is CC18 ✓	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone.
CC18	CC18	I am now calling this CC18B ✓	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area.
CCOPP-06	CC01 <del>8</del>	New site. Call it CC01T	37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right.
CCOPP-07	CC01 <del>8</del>	Apparently taken blw S03 confluence therefore it is CC01H (old DMG CC-4)	37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge.
CCOPP-08	????	This is CC01F	37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine.
<b>Cement Creek Tributaries:</b>						
CC19	CC19		37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.



CC07	CC07		37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC03D	CC03C	This should be CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
CC02D	CC01B	Should be CC02D as in the CC key	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
CCOPP-03	???? CC02A		37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July 2009.
CCOPP-04	???? CC02H		37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009.
CCOPP-03A	???? CC02i		37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CCOPP-03 and CCOPP-04.
QA-0	CC01A	No. 1st time sampled. Call it CC01S	37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek.
CC-01C	CC01C		37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
<b>North Fork Cement Creek:</b>						
CC07	CC07		37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC06	CC06		37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
CCOPP02	CC04	yes	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill.

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August  
Table

**Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary**

Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, <del>ORP</del> , Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
<b>Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)</b>										
A72		37.7919	107.6833	9155	Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37.8028	107.6722	9208	Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37.8111	107.6586	9248	14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
<b>Cement Creek Sampling Locations (Downstream to Upstream)</b>										
CC48	323, 09358550	37.8200	107.6631	9304	Cement Creek gauging station	Yes	Yes	Yes	Yes	
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC18	CCOPP-01	37 53 28.57 = 37.8913	107 38 57.07 = 107.6492	10514	CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	37 53 27.50 = 37.8910	107 38 54.39 = 107.6484	10540	<u>American Tunnel</u> @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

**Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]**

Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC18B	CC18	37.8917	107.6483	10661	Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTSW11; CC-12	37.8951; 37.8939	107.6468; -107.6375	10671	N Fork above CC confl. immed. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation)	37.8946	107.6384	11386	<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC04	CCOPP-02	37 53 38.82	107 38 15.42	11313	NF CC just upstrm of 7level adit flow downhill	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	37.8968	107.6449	10776	<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C	Access NOT granted	37.8972	107.6439		<u>Red &amp; Bonita</u> – Portal discharge	Yes	Yes – needs verified	Yes	Yes	

**Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]**

Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.5435 (UOS 37.9098)	107.3819 (UOS 107.6384)	11358.00 (WCS Chk 11376)	<u>Mogul</u> - @ flume	Yes	Yes - needs verified	Yes	Yes	
CC02A	CCOPP-03	37 54 38.54	107 37 02.60	11603	<u>Mogul Sublevel 1</u> - right drainage base of tails/ waste pile	Yes	Yes - needs verified	Yes	Yes	
CC02H	CCOPP-04	37 54 38.47	107 38 02.73	11604	<u>Mogul Sublevel 1</u> - left drainage base of tails/ waste pile	Yes	Yes - needs verified	Yes	Yes	
CC02i	CCOPP-03A	37 54 38.41	107 38 04.05	11590	<u>Combined flow from CC02A and CC02H</u>	Yes	Yes - needs verified	Yes	Yes	
CC01S	QA-0	37 54 36.84	107 37 59.33	11622	<u>Queen Anne</u> - tributary just upstrm of Cement Creek	Yes	Yes - needs verified	Yes	Yes	
CC01T	CCOPP-06	37 54 36.81	107 38 00.90	11617	<u>Cement Creek</u> - just dwnstrm of QA trib & upstrm of sublevel 1 tribs	Yes	Yes - needs verified	Yes	Yes	
CC01H	CCOPP-07	37 54 36.61	107 37 59.28	11621	<u>Cement Creek</u> - upnstrm of QA trib & dwnstrm	Yes	Yes - needs verified	Yes	Yes	

					of Grd Mogul discharge – make sure mixed!					
CC01F	CCOPP-08	37.54 33.64	107.37 47.46	11781	<u>Cement Creek</u> upstream of Grand Mogul collapsed adit and waste rock	Yes	Yes – needs verified	Yes	Yes	
CC01C	UOS-GTSW10	37.9101	107.6322	11682	<u>Grand Mogul</u> – collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
CC-OPP-09					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-10					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-11						If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-12						If applicable	If applicable	If applicable	If applicable	Yes
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	
CC-FILT-01					Filter Blank QA/QC				Yes– for dissolved fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
Total Samples								21	23	To be determined

<b>Table 2: Field Parameters to collect at surface water sample locations</b>						
<b>Parameter, units</b>	<b>Method</b>	<b>Reporting Limit *</b>	<b>Adjacent Measurement Accuracy Goals</b>	<b>Holding Time</b>	<b>EPA Method Number</b>	<b>Container type</b>
Temperature, °C	Hydrolab or YSI Multimeter Probe	0.1 °C	0.5 °C	Field analysis	EPA 170.1	In situ or field container
Specific Conductance, $\mu$ Siemens/cm	Hydrolab or YSI Multimeter Probe	1 $\mu$ S/cm	15%	Field analysis	EPA 120.1	In situ or field container
pH, standard units (s.u.)	Hydrolab or YSI Multimeter Probe	0.01 s.u.	0.5 s.u.	Field analysis	EPA 150.1	In situ or field container
Dissolved oxygen	Hydrolab or YSI Multimeter Probe	0.0 mg/l	+/- 0.7 mg/l	Field analysis	EPA 360.1	In situ or field container
Oxygen/Reduction Potential (ORP), millivolts (mV)	Hydrolab or YSI Multimeter Probe	+/-	+/- 10 mV	Field analysis	ASTM D1498-76	In situ or field container
Flow, cubic feet/second (cfs)	Marsh McBirney or StreamPro ADCP <sup>TM</sup> Doppler	0.7 cfs	10% rule	Field analysis	EPA R8 SOP 722	NA

**Note: As of May 2009, ORP removed from SAP requirements due to continual issues with ORP meter.**  
**EPA Region 8 Laboratory Standard Operating Procedure (SOP) 720 and SOP 722**  
**Field Sampling Protocols and Field Flow Measurements**

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO4)	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC & DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H3PO4, pH < 2 (can use HCl or H2SO4 also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	HNO3, pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO3, pH < 2	250 mL LDPE

Note: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab that START3 is procuring.

**Table 4: EPA Region 8 Inorganic (Metals) Reporting Limits for Water Samples**

	ICP-OE EPA Method 200.7	ICP-MS EPA Method 200.8	Historic ARSG RLs
Element	ug/L	ug/L	ug/L
Aluminum	100	NA	20
Antimony	NA	1	2
Arsenic	NA	4	1
Barium	4	0.3	0.5
Beryllium	1	NA	0.2
Boron	100	NA	NA
Cadmium	1	0.2	0.2
Calcium	100**	NA	100**
Chromium	2	NA	5
Cobalt	2	NA	2
Copper	10	3	0.8
Iron	100	NA	5
Lead	10	1	0.5
Magnesium	50**	NA	50**
Manganese	2	NA	0.5
Molybdenum	4	NA	0.5
Nickel	2	1	0.3
Potassium	1000**	NA	1000**
Selenium	NA	1	1
Silica	400	NA	200
Silver	8	0.5	0.3
Sodium	500**	NA	500**
Strontium	2	NA	3
Thallium	NA	0.3	20
Titanium	5	NA	5
Vanadium	10	NA	10
Zinc	40	5	4
Hardness (mg/l)**	Calculated from dissolved Ca and Mg		0.2 mg/l
NA = Not applicable			
*Reporting limits for metals vary depending due to variations in sample matrix and individual laboratory abilities. The reporting limits listed above will be used as guidelines and attempts will be made to have these limits met as nearly as feasible.			
** From dissolved fraction			



**Table 5: Reporting Limits Compared to Applicable Water Quality Standards for Animas River Segment 7 and 4a -(Metal concentrations for Dissolved Metals Unless Otherwise Noted by TRec)**

	Region 8 Reporting Limits	Stream Segment 7 (Acute)*	Stream Segment 7 (Chronic)	Stream Segment 4a (Acute)	Stream Segment 4a (Chronic)
Element	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (700-3550)	Monthly Standards [2523 (TRec)]
Arsenic	4	--	100 (TRec)	340	--100 (TRec)
Beryllium	1	--	100 (TRec)	--	--
Cadmium	0.2	To Maintain and Achieve WQS at Segments 4a and 4b	10 (TRec)	TVS 3.1 (trout)	TVS [2.5]
Calcium	100**	--	--	--	--
Chromium III	2	--	100 (TRec)	TVS 1005	TVS 130
Chromium VI	2	--	100 (TRec)	TVS 16	TVS 11
Copper	3	To Maintain and Achieve WQS at Segments 4a and 4b	200 (TRec)	TVS 25.9	TVS [20]
Iron	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (1220 – 3776)	Monthly Standards [4204 (TRec)]
Lead	1	To Maintain and Achieve WQS at Segments 4a and 4b	100 (TRec)	TVS 140	TVS 5
Magnesium	50**	--	--	--	--
Manganese	2	To Maintain and Achieve WQS at Segments 4a and 4b	--	TVS 3700	TVS 2100
Nickel	1	--	200 (TRec)	TVS 842	TVS 93
Selenium	1	--	20 (TRec)	TVS 18.4	TVS 46
Silver	0.5	--	--	TVS 6.7	TVS 0.25 (trout)
Zinc	40	To Maintain and Achieve WQS at Segments 4a and 4b	2000 (TRec)	Monthly Standards (170 – 620)	Monthly Standards [730]
pH		3.7 -9.0		--	Monthly Standards [Existing Quality 5.9 – 9.0]

Notes:

-- Not applicable or not a Contaminant of Concern

\* Animas River Stream Segment 7 is Cement Creek and its tributaries. Segment 7 has a temporary modification to existing quality for all metals.

\*\* From dissolved fraction

[ ] Temporary Modifications for Segment 4a, beginning at TMDL compliance point A72

TRec Total Recoverable

TVS Table Value Standards (Hardness of 200 ug/L assumed)

WQS Water Quality Standards

Sources: ARSG Bill Simon; Colorado Water Quality Control Commission Regulation 31; and Colorado Code of Regulations 5CCR 1002 Regulation 34: "Classification and Numeric Standards for San Juan River and Dolores River Basins;" and UOS 2006

## 2009 Animas River Sampling Locations:

Sampling Location	Prior EPA Location	Latitude	Longitude	Elevation (HAE)	Description:
<b>Animas River:</b>					
✓ A72	A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31. Stakeholder site A72.
✓ A68	A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
<b>Mineral Creek:</b>					
✓ M34	M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
<b>Cement Creek:</b>					
✓ CC48	CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. From town, head toward Silverton ski resort and pull off road at a large slag/tailings pile. Hike downhill toward creek and then upstream to the USGS gage. Sample at the gage.
✓ CC18	CCOPP-01	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone. Site was called CCOPP-01 by EPA in May, June, and July 2009 sampling events.
✓ CC18B	CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples. Look for a 1-foot culvert that goes under the County Road #??? on the opposite side of the creek that marks the sampling area. Site was called CC18 by EPA in May, June, and July 2009 sampling events.
✓ CC01T	CCOPP-06	37 54 36.81 N	107 38 00.90 W	11617	Cement Creek downstream of the Queen Anne tributary and upstream of confluence with Mogul Sublevel 1 tributaries. Park at the tailings pile just upstream of where road crosses the Queen Anne tributary and hike toward the creek to access the site. Sample near the 15-ft pine tree on stream right. Site was called CCOPP-06 by EPA during July 2009 sampling event.
✓ CC01H	CCOPP-07	37 54 36.61 N	107 37 59.28 W	11621	Cement Creek upstream of Queen Anne tributary but downstream of confluence with the Grand Mogul discharge. Be sure stream is well-mixed at sampling point. In July 09, substrate was brown in color thanks to the Grand Mogul discharge. Site was called CCOPP-07 during July 2009 sampling event. Site was called CC-4 by DMG in an old report.
✓ CC01F	CCOPP-08	37 54 33.64 N	107 37 47.46 W	11781	Cement Creek upstream of Grand Mogul adit and tailings. Sample at start of steep uphill where grass border meets the scree of the Grand Mogul Mine. Called CCOPP-08 by EPA during July 2009 sampling event.

### Cement Creek Tributaries:

?  
west of rock

✓ CC19	CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.
✓ CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
✓ CC03D	CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
✓ CC02D	CC02D	37 54 36.14 N ✓	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
✓ CC02A	CCOPP-03	37 54 38.54 W	107 38 02.60 W	11603	Mogul Sublevel 1 right drainage at base of tailings pile. Had more flow than left drainage in July 2009. <i>wasterock ?</i>
✓ CC02H	CCOPP-04	37 54 38.47 N	107 38 02.73 W	11604	Mogul Sublevel 1 left drainage at base of tailings pile. Flow was minimal in July 2009.
✓ CC02i	CCOPP-03A	37 54 38.41 N	107 38 04.05 W	11590	Combined flow of the Mogul Sublevel 1 drainages just upstream of the confluence with Cement Creek. Use this site in the future for it includes the flow from CCOPP-03 and CCOPP-04.
✓ CC01S	QA-0	37 54 36.84 N	107 37 59.33 W	11622	Queen Anne tributary upstream of confluence with Cement Creek. Park at tailings pile just beyond where road crosses this drainage. Sample just upstream of confluence with Cement Creek. Site was called QA-0 by EPA during July 2009 sampling event.
CC-01C	CC01C	37 54 35.72 N	107 37 51.66 W	11682	Grand Mogul adit at toe of waste pile. Take flow measurements further downstream and just upstream of confluence with Cement Creek.
Bsimon ID needed	CCOPP-05	37 54 35.78 N	107 37 51.54 W	11690	Right seep toward bottom of Grand Mogul waste rock; less iron staining, moss growth
<b>North Fork Cement Creek:</b>					
✓ CC07	CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
✓ CC06	CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
✓ CC04	CCOPP-02	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill. Site was called CCOPP02 by EPA during May, June, and July 2009 sampling events.

*not milled*

Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)										
A72		37.7919	107.6833	9155	Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37.8028	107.6722	9208	Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37.8111	107.6586	9248	14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream)										
CC48	323, 09358550	37.8200	107.6631	9304	Cement Creek gauging station	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18	CCOPP-01	37 53 28.57 = 37.8913	107 38 57.07 = 107.6492	10514	CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	37 53 27.50 = 37.8910	107 38 54.39 = 107.6484	10540	<u>American Tunnel</u> @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18B	CC18	37.8917	107.6483	10661	Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTSW11; CC-12	37.8951; 37.8939	107.6468; - 107.6375	10671	N Fork above CC confl. immed. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation)	37.8946	107.6384	11386	<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC04	CCOPP-02	37.53 38.82	107.38 15.42	11313	NF CC just upstrm of 7level adit flow downhill	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	37.8968	107.6449	10776	<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C	Access NOT granted	37.8972	107.6439		<u>Red &amp; Bonita</u> Portal discharge	Yes	Yes – needs verified	Yes	Yes	

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<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
<b>Sample Location ID</b>	<b>Location Alias(es)</b>	<b>Latitude (North)</b>	<b>Longitude (West)</b>	<b>Elevation</b>	<b>Location Description</b>	<b>Field Parameters</b>			<b>Routine Water Quality Analyses</b>	<b>Opportunity Water Quality Analyses</b>
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC02E					<b>Gold Point adit</b>	Yes	Yes – needs 1 <sup>st</sup> time collection	Yes	Yes	
CC02J					<b><u>Small adit betw CC02E and CC02D</u></b>	Yes	Yes – needs 1 <sup>st</sup> time collection	Yes	Yes	
CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.5435 (UOS 37.9098)	107.3819 (UOS 107.6384)	11358.00 (WCS Chk 11376)	<b><u>Mogul</u></b> – @ flume	Yes	Yes – needs verified	Yes	Yes	
CC02A	CCOPP-03	37 54 38.54	107 37 02.60	11603	<b><u>Mogul Sublevel 1</u></b> - right drainage base of tails/ waste pile	Yes	Yes – needs verified	Yes	Yes	
CC02H	CCOPP-04	37 54 38.47	107 38 02.73	11604	<b><u>Mogul Sublevel 1</u></b> - left drainage base of tails/ waste pile	Yes	Yes – needs verified	Yes	Yes	
CC02i	CCOPP-03A	37 54 38.41	107 38 04.05	11590	<b><u>Combined flow from CC02A and CC02H</u></b>	Yes	Yes – needs verified	Yes	Yes	
CC01S	QA-0	37 54 36.84	107 37 59.33	11622	<b><u>Queen Anne</u></b> - tributary just upstrm of Cement Creek	Yes	Yes – needs verified	Yes	Yes	

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<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC01T	CCOPP-06	37 54 36.81	107 38 00.90	11617	<u>Cement Creek</u> – just dwnstrm of QA trib & upstrm of sublevel 1 trib	Yes	Yes – needs verified	Yes	Yes	
CC01H	CCOPP-07	37 54 36.61	107 37 59.28	11621	<u>Cement Creek</u> – upnstrm of QA trib & dwnstrm of Grd Mogul discharge – make sure mixed!	Yes	Yes – needs verified	Yes	Yes	
CC01F	CCOPP-08	37 54 33.64	107 37 47.46	11781	<u>Cement Creek</u> upstream of Grand Mogul collapsed adit and waste rock	Yes	Yes – needs verified	Yes	Yes	
CC01C	UOS-GTSW10	37.9101	107.6322	11682	<u>Grand Mogul</u> – collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
CC-OPP-09					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-10					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-11						If applicable	If applicable	If applicable	If applicable	Yes
CC-OPP-12						If applicable	If applicable	If applicable	If applicable	Yes
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	

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CC-FILT-01					Filter Blank QA/QC				Yes– for dissolved fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
<b>Total Samples</b>								<b>21</b>	<b>23</b>	<b>To be determined</b>



<b>Table 2: Field Parameters to collect at surface water sample locations</b>						
<b>Parameter, units</b>	<b>Method</b>	<b>Reporting Limit *</b>	<b>Adjacent Measurement Accuracy Goals</b>	<b>Holding Time</b>	<b>EPA Method Number</b>	<b>Container type</b>
Temperature, °C	Hydrolab or YSI Multimeter Probe	0.1 °C	0.5 °C	Field analysis	EPA 170.1	In situ or field container
Specific Conductance, $\mu$ Siemens/cm	Hydrolab or YSI Multimeter Probe	1 $\mu$ S/cm	15%	Field analysis	EPA 120.1	In situ or field container
pH, standard units (s.u.)	Hydrolab or YSI Multimeter Probe	0.01 s.u.	0.5 s.u.	Field analysis	EPA 150.1	In situ or field container
Dissolved oxygen	Hydrolab or YSI Multimeter Probe	0.0 mg/l	+/- 0.7 mg/l	Field analysis	EPA 360.1	In situ or field container
Flow, cubic feet/second (cfs)	Marsh McBirney or StreamPro ADCP" Doppler	0.7 cfs	10% rule	Field analysis	EPA R8 SOP 722	NA

**Note: As of May 2009, ORP removed from SAP requirements due to continual issues with ORP meter.**  
**EPA Region 8 Laboratory Standard Operating Procedure (SOP) 720 and SOP 722**  
**Field Sampling Protocols and Field Flow Measurements**

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO4)	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC &DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H3PO4, pH < 2 (can use HCl or H2SO4 also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	HNO3, pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO3, pH < 2	250 mL LDPE

Note: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab that START3 is procuring.

**Table 4: EPA Region 8 Inorganic (Metals) Reporting Limits for Water Samples**

	ICP-OE EPA Method 200.7	ICP-MS EPA Method 200.8	Historic ARSG RLs
Element	ug/L	ug/L	ug/L
Aluminum	100	NA	20
Antimony	NA	1	2
Arsenic	NA	4	1
Barium	4	0.3	0.5
Beryllium	1	NA	0.2
Boron	100	NA	NA
Cadmium	1	0.2	0.2
Calcium	100**	NA	100**
Chromium	2	NA	5
Cobalt	2	NA	2
Copper	10	3	0.8
Iron	100	NA	5
Lead	10	1	0.5
Magnesium	50**	NA	50**
Manganese	2	NA	0.5
Molybdenum	4	NA	0.5
Nickel	2	1	0.3
Potassium	1000**	NA	1000**
Selenium	NA	1	1
Silica	400	NA	200
Silver	8	0.5	0.3
Sodium	500**	NA	500**
Strontium	2	NA	3
Thallium	NA	0.3	20
Titanium	5	NA	5
Vanadium	10	NA	10
Zinc	40	5	4
Hardness (mg/l)**	Calculated from dissolved Ca and Mg		0.2 mg/l
NA = Not applicable			
*Reporting limits for metals vary depending due to variations in sample matrix and individual laboratory abilities. The reporting limits listed above will be used as guidelines and attempts will be made to have these limits met as nearly as feasible.			
** From dissolved fraction			

**Table 5: Reporting Limits Compared to Applicable Water Quality Standards for Animas River Segment 7 and 4a -(Metal concentrations for Dissolved Metals Unless Otherwise Noted by TRec)**

	Region 8 Reporting Limits	Stream Segment 7 (Acute)*	Stream Segment 7 (Chronic)	Stream Segment 4a (Acute)	Stream Segment 4a (Chronic)
Element	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (700-3550)	Monthly Standards [2523 (TRec)]
Arsenic	4	--	100 (TRec)	340	--100 (TRec)
Beryllium	1	--	100 (TRec)	--	--
Cadmium	0.2	To Maintain and Achieve WQS at Segments 4a and 4b	10 (TRec)	TVS 3.1 (trout)	TVS [2.5]
Calcium	100**	--	--	--	--
Chromium III	2	--	100 (TRec)	TVS 1005	TVS 130
Chromium VI	2	--	100 (TRec)	TVS 16	TVS 11
Copper	3	To Maintain and Achieve WQS at Segments 4a and 4b	200 (TRec)	TVS 25.9	TVS [20]
Iron	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (1220 – 3776)	Monthly Standards [4204 (TRec)]
Lead	1	To Maintain and Achieve WQS at Segments 4a and 4b	100 (TRec)	TVS 140	TVS 5
Magnesium	50**	--	--	--	--
Manganese	2	To Maintain and Achieve WQS at Segments 4a and 4b	--	TVS 3700	TVS 2100
Nickel	1	--	200 (TRec)	TVS 842	TVS 93
Selenium	1	--	20 (TRec)	TVS 18.4	TVS 46
Silver	0.5	--	--	TVS 6.7	TVS 0.25 (trout)
Zinc	40	To Maintain and Achieve WQS at Segments 4a and 4b	2000 (TRec)	Monthly Standards (170 – 620)	Monthly Standards [730]
pH		3.7 -9.0		--	Monthly Standards [Existing Quality 5.9 – 9.0]

Notes:

-- Not applicable or not a Contaminant of Concern

\* Animas River Stream Segment 7 is Cement Creek and its tributaries. Segment 7 has a temporary modification to existing quality for all metals.

\*\* From dissolved fraction

[ ] Temporary Modifications for Segment 4a, beginning at TMDL compliance point A72

TRec Total Recoverable

TVS

Table Value Standards (Hardness of 200 ug/L assumed)

WQS

Water Quality Standards

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Sources: ARSG Bill Simon; Colorado Water Quality Control Commission Regulation 31; and Colorado Code of Regulations 5CCR 1002 Regulation 34: "Classification and Numeric Standards for San Juan River and Dolores River Basins;" and UOS 2006.



## 2009 Animas River Sampling Locations:

Sampling Location	Latitude	Longitude	Elevation (HAE)	Description:
<b>Animas River:</b>				
A72	37 47 24.21 N	107 40 03.30 W	9155	Animas River downstream of the confluence with Mineral Creek and downstream of Silverton. Site is alongside County Road 31.
A68	37 48 40.34 N	107 39 33.32 W	9248	Animas River upstream of the confluence with Cement Creek and Mineral Creek in Silverton. Sample at County Road 20 / 14th Street road crossing.
<b>Mineral Creek:</b>				
M34	37 48 09.72 N	107 40 21.77 W	9208	Mineral Creek upstream of confluence with the Animas River near Hwy 550 crossing.
<b>Cement Creek:</b>				
CC48	37 49 04.07 N	107 39 42.49 W	9304	Cement Creek upstream of Silverton and upstream of confluence with the Animas River. Site is alongside State Hwy 110.
CCOPP01	37 53 28.57 N	107 38 57.07 W	10514	Cement Creek upstream of South Fork but downstream of American Tunnel confluence. Sample upstream of road crossing in Gladstone.
CC19	37 53 27.50 N	107 38 54.39 W	10540	American Tunnel mine adit. Sample where flow comes out of the ground.
CC18	37 53 39.20 N	107 38 50.08 W	10661	Cement Creek upstream of the American Tunnel confluence but downstream of the North Fork. Park at CC07 and hike about 100 meters downstream to where the site is well mixed to collect the samples.
CC03D	37 53 48.46 N	107 38 41.61 W	10776	Red and Bonita mine adit. Collect sample at culvert that goes under the road.
CC02D	37 54 36.14 N	107 38 17.26 W	11376	Mogul Mine adit. Collect sample downstream of the mine pool at the 3-inch Parshall Flume.
<b>North Fork Cement Creek:</b>				
CC07	37 53 42.34 N	107 38 48.30 W	10671	North Fork of Cement Creek upstream of confluence with Cement Creek. Sample upstream of road crossing.
CC06	37 53 40.50 N	107 38 18.09 W	11386	7-Level mine adit upstream of the confluence with the North Fork of Cement Creek. Sample where flow comes out of the mine tunnel.
CCOPP02	37 53 38.82 N	107 38 15.42 W	11313	North Fork of Cement Creek just upstream of confluence with the 7-Level mine adit. Sample upstream of the road switchback and upstream of the 7-Level flow that comes down the hill.

# Flow Calculations For The Animas River Watershed: May 18-20, 2009

Station ID: **A72** Flow data from this site was downloaded from the USGS Real-time flow wesite at: <http://waterdata.usgs.gov/nwis/rt/>  
 Date & Time: 05/18/2009 @ 19:00 Site is designated: "USGS 09359020 Animas River below Silverton, CO."  
 Total Flow (cfs): 1710

Station ID: **A68** Flow data from this site was downloaded from the USGS Real-time flow wesite at: <http://waterdata.usgs.gov/nwis/rt/>  
 Date & Time: 05/19/2009 @ 10:45 Site is designated: "USGS 09358000 Animas River at Silverton, CO."  
 Total Flow (cfs): 508

Station ID: **M34** Flow data from this site was downloaded from the USGS Real-time flow wesite at: <http://waterdata.usgs.gov/nwis/rt/>  
 Date & Time: 05/19/2009 @ 09:15 Site is designated: "USGS 09359010 Mineral Creek at Silverton, CO."  
 Total Flow (cfs): 416

Station ID: **CC48** Flow data from this site was downloaded from the USGS Real-time flow wesite at: <http://waterdata.usgs.gov/nwis/rt/>  
 Date & Time: 05/19/2009 @ 10:45 Site is designated: "USGS 09358550 Cement Creek at Silverton, CO."  
 Total Flow (cfs): 227

Station ID:	CCOPP01	Width Increment (ft):	0.25	0.625	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Date & Time:	05/19/2009 @ 12:45	Depth (ft):	0.5	0.55	0.9	0.85	0.7	0.9	0.8	0.8	0.7	0.7	0.85	0.65	0.75	0.95	0.7
Total Width (ft):	18.5	Velocity (ft/sec):	0	1.88	3.04	4.62	5.36	2.31	4.98	2.24	4.84	4.96	3.98	4.39	3.88	4.14	6.19
Total Flow (cfs):	48.8	Discharge (cfs):	0	0.6463	2.052	2.9453	2.814	1.5593	2.988	1.344	2.541	2.604	2.5373	2.1401	2.1825	2.9498	3.2498
		Width Increment (ft):	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
		Depth (ft):	0.9	0.75	0.65	0.55	0.6	0.6	0.65	0.55	0.45	0.25					
		Velocity (ft/sec):	3.88	4.33	4.64	4.1	3.72	1.9	2.18	2.72	1.73	0.83					
		Discharge (cfs):	2.619	2.4356	2.262	1.6913	1.674	0.855	1.0628	1.122	0.5839	0.0778					

Station ID: **CC-19** Flow was measured using a 3-inch Parshall flume manufactured by Tracom, Inc. I went to their website to get flow from a discharge table:  
 Date & Time: 05/19/2009 @ 13:30  
 Total Flow (cfs): 0.318  
 Total Flow (gpm): 143

Ha	cfs	GPM	MGD
0.48	0.318	142.7	0.2055

Station ID: **CC03D** Flow was measured using a 4-inch flume: Throat Width: Ha CFS GPM Hb  
 Date & Time: 05/19/2009 @ 17:10  
 Total Flow (cfs): 0.749  
 Total Flow (gpm): 336

4 Inch:	Ha	CFS	GPM	Hb
	0.6	0.7488	335.52	0.24

Station ID: **CC02D** Flow was measured using a 3-inch Parshall flume manufactured by Tracom, Inc. I went to their website to get flow from a discharge table:  
 Date & Time: 05/20/2009 @ 15:30  
 Total Flow (cfs): 0.259  
 Total Flow (gpm): 116

Ha	cfs	GPM	MGD
0.42	0.259	116	0.1671





Sampling Station	Sample Date	Collection Time	Field Measurements						Acidity *
			Flow cfs	Flow gpm	Temp °C	Cond µS/cm	pH su	DO mg/l	
Animas River:									
A72	05/18/09	19:05	1710	767448	4.71	103	7.08	8.9	----
A68	05/19/09	10:45	508	227990	5.08	113	7.15	8.2	----
Mineral Creek:									
M34	05/19/09	9:20	416	186701	3.85	115	6.49	8.7	----
Cement Creek:									
CC48	05/19/09	10:40	227	101878	5.24	203	5.40	8.5	----
CCOPP01	05/19/09	12:25	48.8	21897.7	5.95	261	3.86	7.9	----
CC19	05/19/09	13:00	0.318	142.718	7.56	2338	4.91	4.6	----
CC18	05/19/09	14:30	----		4.74	212	4.04	8.2	----
CC03D	05/19/09	16:46	0.749	336.061	9.17	2074	5.86	7.1	----
CC02D	05/20/09	15:30	0.259	116.060	5.19	1274	3.11	4.9	----
				0.0					
North Fork Cement Creek:				0.0					
				0.0					
CC07	05/19/09	14:40	5.04	2260.87	6.01	750	3.14	7.4	----
CC07	05/19/09	17:50	----		4.01	585	3.01	8.2	----
CC06	05/20/09	10:40	0.423	189.798	8.76	3076	2.25	6.0	----
CCOPP02	05/20/09	12:00	2.44	1095.16	1.49	96	4.37	9.2	----

\* Note: Acidity, TSS, and TDS analyses were performed by the Paragon analytical laboratory in Ft. Collins, CO.

"-t" = total recoverable "-d" = dissolved

OPP-02 added May 09  
OPP-03, 04, 05 added June 09  
at ~~Cement Creek~~ drainage  
at pile between Highway 1  
Lid Hozen

**Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary**

Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total &Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS,TDS, Chloride	TAL Total &Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS,TDS, Chloride
Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)										
A72		37.7919	107.6833		Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37.8028	107.6722		Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37.8111	107.6586		14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream)										
CC48	323, 09358550	37.8200	107.6631	9,400.00	Cement Creek gauging station	Yes	Yes	Yes	Yes	
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CCOPP-01	none	Unknown	Unknown		CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	Unknown	Unknown		American Tunnel @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
Cement Creek Sampling Locations (Downstream to Upstream) [continued]										
CC18		37.8917	107.6483		Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTWSW11; CC-12	37.8951; 37.8939	107.6468; - 107.6375		N Fork above CC confl. immed. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation) <i>CCOPP-02 N Fork above GK7 in flow</i>	37.8946	107.6384		<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	37.8968	107.6449		<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C <i>no access granted</i>		37.8972	107.6439		<u>Red &amp; Bonita</u> – Portal discharge	Yes	Yes – needs verified	Yes	Yes	

<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sub>3</sub> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.5435 (UOS 37.9098)	107.3819 (UOS 107.6384)	11358.00	<u>Mogul</u> - @ flume	Yes	Yes	Yes	Yes	
CC01C	UOS-GTSW10	37.9101 <i>In ARSG sheets 37.5439</i>	107.6322 <i>107.3801</i>	<i>11708</i>	<u>Grand Mogul</u> - collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
CC-OPP-02					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	
CC-OPP-03					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	
CC-FILT-01					Filter Blank QA/QC				Yes- for dissolved fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
<b>Total Samples</b>								<b>14</b>	<b>16</b>	<b>1</b>

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO <sub>4</sub> )	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC & DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H <sub>3</sub> PO <sub>4</sub> , pH < 2 (can use HCl or H <sub>2</sub> SO <sub>4</sub> also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	HNO <sub>3</sub> , pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO <sub>3</sub> , pH < 2	250 mL LDPE

Note: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab – collect 1 liter unfiltered for these analyses.



812-07

Last  
Comment



[illegible]

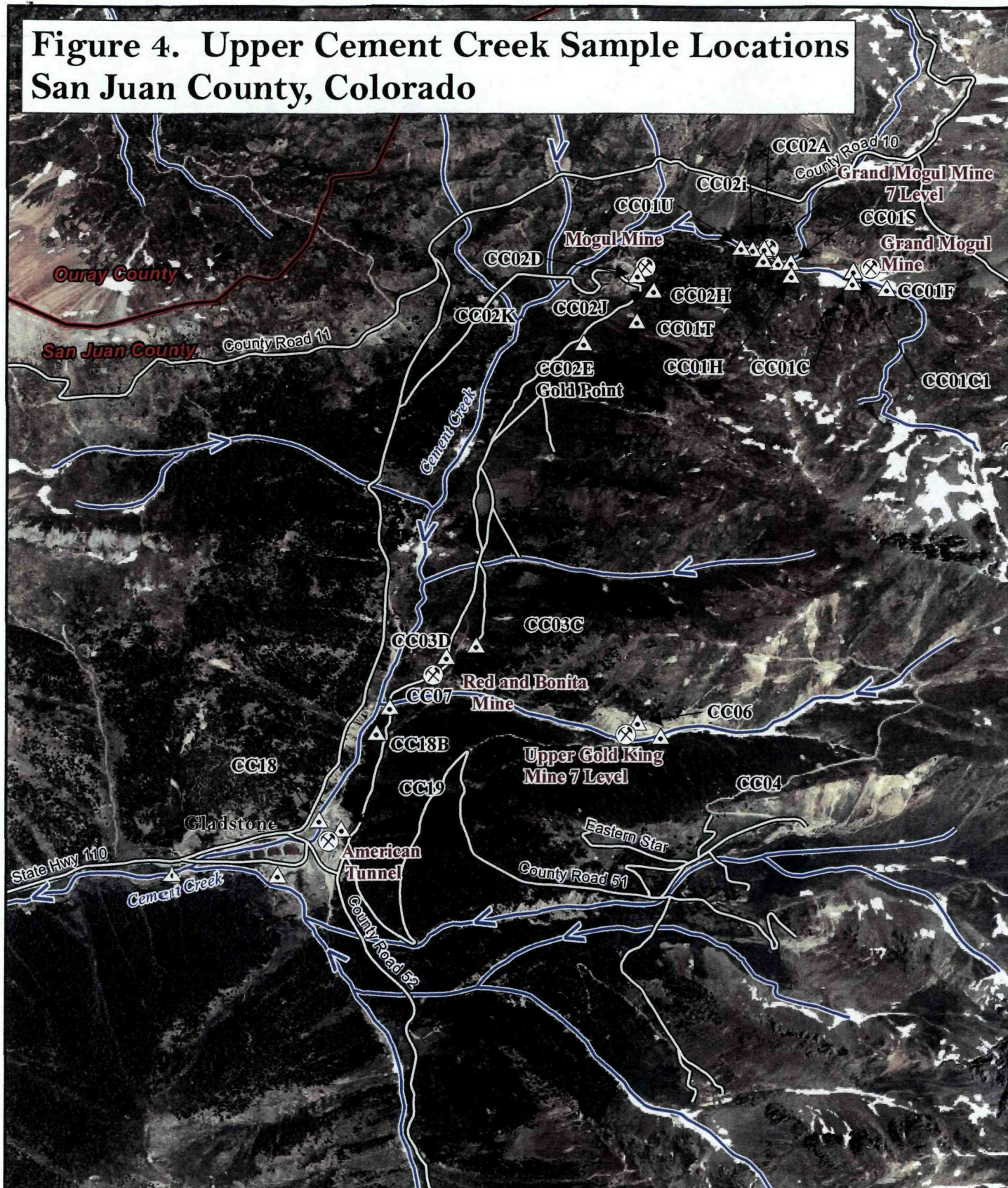
# Key to Cement Creek Sites and Site Descriptions (Mar.,08)

BASIN	NEW SITE DESCRIPTION	STRM DESCR	SITE DESCR. ALIAS OTHER	NEW SITE	OLD SITE DI	Other Aliases	NEW SITE	OTHER ALIASES	MISNOMMERS	SAMPLE NUMBER	AGENCY	TYPE	PURPOSE	LAT_DD	LONG_DD	Elevation	UTM	UTM
Bold = changes and new columns				Italics = to be deleted from database				Designation mostly WQCI Herron, SGC, I DESIGNATION				(often previous site designations)						
CEMENT	Mogul Mine			CC01B			CC01B							375435	1073819	11358.00	268109	4196904
CEMENT	CC below Mogul	Cement		CC01	CC01		CC01				WQCD	S	M	37.9117	107.6389			
CEMENT	Queen Anne	Queen Anne Mine		CC01A		SO-1	CC01A											
CEMENT	Grand Mogul	Grand Mogul		CC01C	RB23	SO-3	CC01C			SO1H	DMG	A	M					
CEMENT	Above Queen Anne	Above Queen Anne		CC01E		CC-1	CC01E			SO3H	DMG	A	M	375439	1073801	11708.00	268760	4196886
CEMENT	Background Below Ross Basin	Background Below Ross Basin		CC01F		CC-3	CC01F			CC1H	DMG	S	M					
CEMENT	CC Below Queen Anne	CC Below Queen Anne		CC01G		CC-2	CC01G			CC3L	DMG	S	M					
CEMENT	CC above Queen Anne confluence	CC Below SO-3		CC01H		CC-4	CC01H			CC2L	DMG	S	M					
CEMENT	Below Hurricane Mine Complex	Below Hurricane Mine Complex		CC01I		CC-32	CC01I			CC4L	DMG	S	M					
CEMENT	stream below dump before waterfall	stream below dump before waterfall		CC01J		GA-1	CC01J			CC32H	DMG	S	M					
CEMENT	Unknown site			CC01J		GA-1	CC01J			GA-1	ARSG	S	M					
CEMENT	Upper Ross: Large trib. a & above dump			CC01K		RO1015					CSM	S	M				08/13/98	
CEMENT	Upper Ross: small trib. below dump			CC01L		RO1016	GA-2	CC01K		GA-2	CSM	S	M				08/13/98	
CEMENT	Upper Ross: large trib. below dump			CC01L		RO1017		CC01L		RO1017	CSM	S	M				08/13/98	
CEMENT	Lewis property: above adit, between shafts			CC01M		RO1018					CSM	S	M				08/13/98	
CEMENT	Lewis property: Up stream from dump			CC01N		LW1010					CSM	Pond	M				08/13/98	
CEMENT	Upper Queen Ann			CC01O		LW1011					CSM	S	M				08/13/98	
CEMENT	Upper Queen Ann			CC01O		LW1012					CSM	S	M				08/13/98	
CEMENT	Lewis property: drainage from dump			CC01P		LW1013					CSM	A	M				08/13/98	
CEMENT	Lewis property: pond			CC01Q		LW1014					CSM	S	M				08/13/98	
CEMENT	CC Above Ferricrete		Cement	CC01R		LW1015					CSM	Pond	M				08/13/98	
CEMENT	Mogul waste pile seep			CC02		CC-7	CC02			CC7H	DMG	S	M					
CEMENT	CC Below Mogul	CC Below Mogul		CC02A														
CEMENT	CC Above Mogul	CC Above Mogul		CC02B		CC-6	CC02B			CC5H	DMG	S	M					
CEMENT	Mogul	Mogul		CC02C		CC-5	CC02C			CC5H	DMG	S	M					
CEMENT	Mine South of Mogul	Mine South of Mogul		CC02D		SO-5	CC02D			SO5H	DMG	A	M				268109	4196904
CEMENT	Corkscrew Gulch Pond	Corkscrew Gulch Pond		CC02E	0122-01	SO-7; dump #2	CC02E			SO7H	DMG	A	M					
CEMENT	Adit below Mogul Open Slope, river right	Adit below Open Slope; river right		CC02F		GA-26	CC02F			GA-26	ARSG	POND	M					
CEMENT	CC below lower ferricrete	Below Lower Ferricrete		CC02G		RB21												
CEMENT	Below North Ferricrete	Below North Ferricrete		CC03		CC-9	CC03		CC03	CC8H	DMG	S	M					
CEMENT	Rad & Bonita Mine	Rad & Bonita Mine		CC03B		CC-8	CC03B			CC8H	DMG	S	M					
CEMENT	NF CC above Gold King	NF Cement		CC03C		SO-8	CC03C			SO8H	DMG	A	M					
CEMENT	CC below NF	Below North Fork		CC04		CC-SW-10	CC04				WQCD	S	M	37.8944	107.6328			
CEMENT	Gold King 7 level			CC05		CC-13	CC05			CC13H	DMG	S	M					
CEMENT	NF Cement below Gold King	NF Cement		CC06														
CEMENT	NF Cement at confluence	NF Cement	North Fork Above CC	CC06A														
CEMENT	Minnehaha at Lead Carbonate	Minnehaha		CC07		CC-12	CC07				WQCD	S	M	37.8939	107.6375			
CEMENT	Minnehaha Background	Minnehaha Background		CC08		CC-8	CC08				WQCD	S	M	37.8900	107.6319			
CEMENT	Minnehaha below Black Hawk road	Minnehaha		CC08A		CC-14	CC08A			CC14H	DMG	S	M					
CEMENT	Minnehaha Below Lead Carbonate	Minnehaha Below Lead Carbonate		CC09		CC-9	CC09				WQCD	S	M	37.8911	107.6375			
CEMENT	Black Hawk adit	MF Cement adit		CC09A		CC-15	CC09A			CC15H	DMG	S	M					
CEMENT	MF below Occidental	MF Cement		CC10		CC-10	CC10				WQCD	A	M	0.0000	0.0000			
CEMENT	MF above Occidental	Middle Fork Above Mine Blockage		CC11		CC-18	CC11				WQCD	S	M	37.8800	107.6347			
CEMENT	Minnehaha at S F road	Minnehaha		CC11B		CC-17	CC11B			CC17H	DMG	S	M					
CEMENT	Minnehaha at S F road	Minnehaha Above SF		CC12		CC-12	CC12				WQCD	S	M	37.8869	107.6464			
CEMENT	MF above SF road	MF Above SF		CC12A		CC-16	CC12A			CC18H	DMG	S	M					
CEMENT	MF below SF road			CC13		CC-20	CC13			CC20H	DMG	S	M					
CEMENT	MF Below Blackhawk	MF Below Blackhawk		CC13A		CC-20	CC13A											
CEMENT	Black Hawk Mine	Black Hawk Mine		CC13B		CC-19	CC13B			CC19H	DMG	S	M					
CEMENT	Adit below Blackhawk, in stream	Black Hawk Mine		CC13C		SO-12	CC13C		CC10	SO12H	DMG	A	M					
CEMENT	Silver Ledge	Silver Ledge		CC14		CC-14	CC14				USGS	A	M					
CEMENT	SF above Silver Ledge	SF Cement		CC15		CC-21	CC15			SO13H	DMG	A	M	375236	1073838	10,970	267459	4195221
CEMENT	Adit W. side SF, below lake	SF Cement Creek		CC16		0192-01	CC16				WQCD	S	M	37.8766	107.6439			
CEMENT	SF Cement b/w Natalie lake-Natalie rd	SF Cement Creek		CC17		0192-02	CC17				BLM	A	M					
CEMENT	SF Cement above MF	SF Cement		CC18		CC-16	CC18				BLM	Pond	M					
CEMENT	SF Below Silver Ledge	SF Below Silver Ledge		CC18B		CC-22	CC18B			CC22H	DMG	S	M	37.8842	107.6464			
CEMENT	Big Colorado	Big Colorado		CC19		SO-17	CC19			SO17H	DMG	A	M	375237	1073846	11,060	267264	4195257
CEMENT	SF above CC	SF Above CC	SF Cement	CC20		CC-23; CS0002	CC20			CC23H	DMG	S	M	37.8894	107.6508			
CEMENT	CC above CC, below MF			CC21		CC-17A	CC21											
CEMENT	CC above treatment plant	Cement		CC22		CC-18	CC22				SGC	S	M	37.8917	107.6483			
CEMENT	American Tunnel	Cement Amer Tnl		CC23		CC-19	CC23				WQCD	NPDES	P	0.0000	0.0000			
CEMENT	Cement ditch	Cement ditch		CC24		CC-19a	CC24				WQCD	P	M	0.0000	0.0000			
CEMENT	SGC Treatment discharge			CC25														
CEMENT	CC below treatment plant	CC Below Sunnyside Por	CC above SF	CC26		CC-33	CC26		CC2-A&B	CC33H	DMG	S	M					
CEMENT	CC below SF	CC Below SF	Cement	CC27		CC-24	CC27			CC24H	DMG	S	M					
CEMENT	Cement Creek Gas Spring			CC28														
CEMENT	CC above Prospect	CC above Prospect		CC29		CC-25	CC29			CC25FEB	DMG	S	M					
CEMENT	Evelyn Mine	Adelaide Mine	Evelyn Mine	CC30		SO-24	CC30				USGS	A	M	375318	1073955	10580	265665	4196564
CEMENT	Dry Gulch above rd.			CC31		GA-27	CC31											
CEMENT	Prospect trib. above road	Prospect		CC32		CC-22	CC32				WQCD	S	M	0.0000	0.0000			
CEMENT	Above Henrietta 7	Above Henrietta 7		CC33		PG-11	CC33			PG11H	DMG	S	M					
CEMENT	Undisturbed Tributary	Undisturbed Tributary		CC34		PG-10	CC34			PG10H	DMG	S	M					
CEMENT	Below Mineralized Canyon	Below Mineralized Canyon		CC35		PG-8	CC35			PG8H	DMG	S	M					
CEMENT	Prospect at Hen. Level 3 road	Prospect	Below Upper Mines	CC36		PG-6; GA-21	CC36		GA-21	GA-21	ARSG	S	M	37.8914	107.6858			
CEMENT	Tributary Below Draining Mine	Tributary Below Draining Mine		CC37		GA-20	CC37			GA-20	ARSG	S	M					
CEMENT	Below Mine Drainages	Below Mine Drainages		CC38		PG-5	CC38			GA-19	ARSG	S	M					
CEMENT	Background-Upper Prospect	Background-Upper Prospect		CC39		PG-4	CC39			GA-18	ARSG	S	M					
CEMENT	Below Galena Queen	below Galena Queen & Below Galena Queen		CC40		PG-3	CC40			GA-17	ARSG	S	M					
CEMENT	Background-Upper Prospect	above and south of Herci Background-Upper Prospect		CC41		GA-16	CC41			GA-16	ARSG	S	M					
CEMENT	Background-Upper Prospect	above Hercules & Galeni Background-Upper Prospect		CC42		GA-15	CC42			GA-15	ARSG	S	M					
CEMENT	Tributary Above Hercules	N. of Hercules	Tributary Above Hercules	CC43		PG-1	CC43			GA-14	ARSG	S	M					
CEMENT	Galena Queen Shaft			CC44		PG-20	CC44			GA-28	ARSG	S	M					
CEMENT	Prospect below Hen. 7	Prospect	Below Tributary PG14	CC45		CC-24	CC45				WQCD	S	M	37.8911	107.6803			
CEMENT	Below Henrietta 7	Below Henrietta 7		CC46		PG-15	CC46			PG15H	DMG	S	M					

XTRA FIGURES  
tracking locations  
& new locations



**Figure 4. Upper Cement Creek Sample Locations  
San Juan County, Colorado**



△ Cement Creek  
Sample Locations  
(Approximate due to Map Scale)

⊗ Mine Location

== Streets

~> Streams with Flow Direction

— County Boundaries

0 0.25 0.5 Miles

Date: June 2nd, 2010

Coordinate System/Projection:  
UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



TechLaw

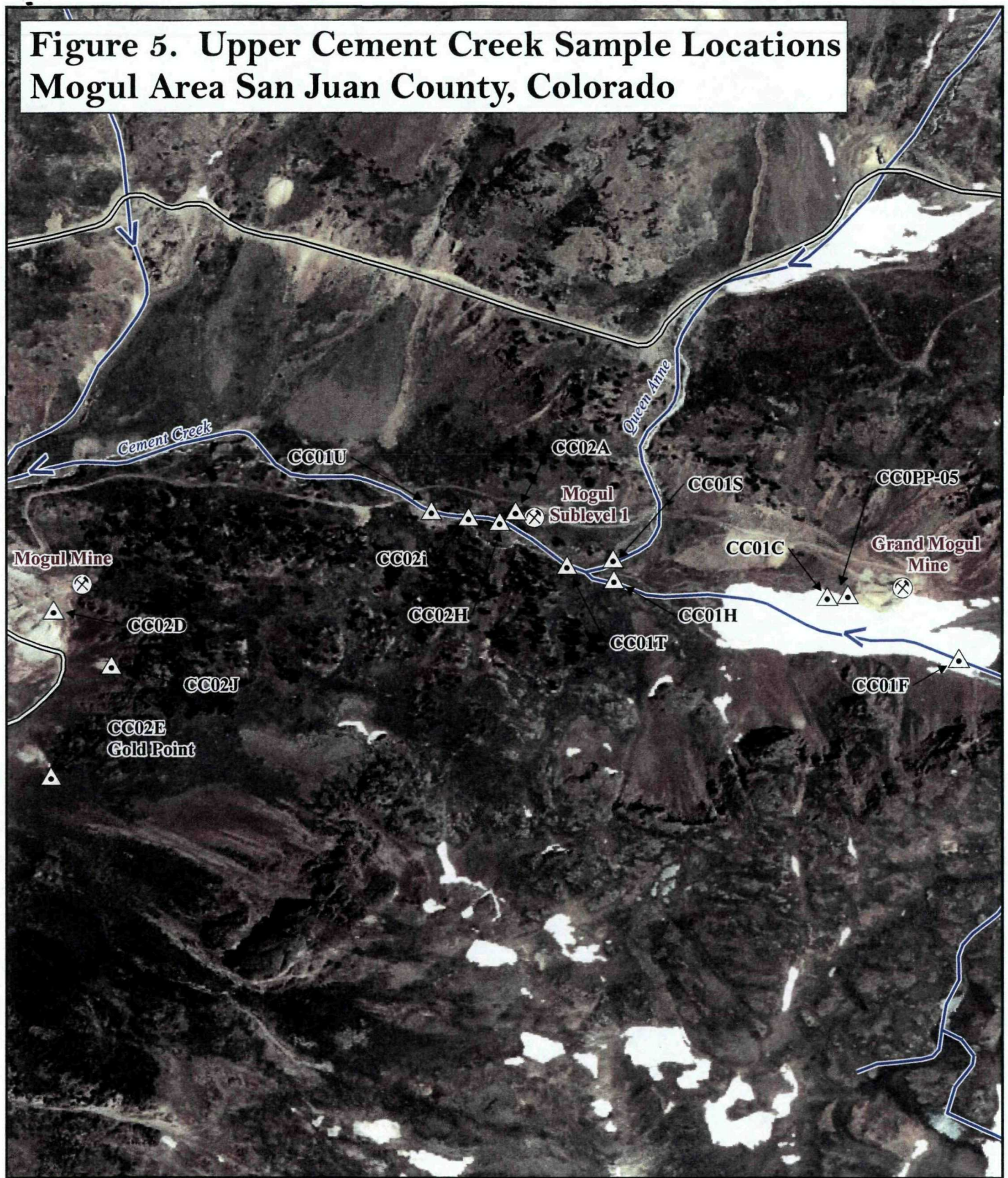
Colorado



Area of Interest



**Figure 5. Upper Cement Creek Sample Locations  
Mogul Area San Juan County, Colorado**



Cement Creek  
Sample Locations



Mine Location



Streets



Rivers and Streams



Stream Flow Direction

0 300 600 Feet

Date: June 2nd, 2010

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



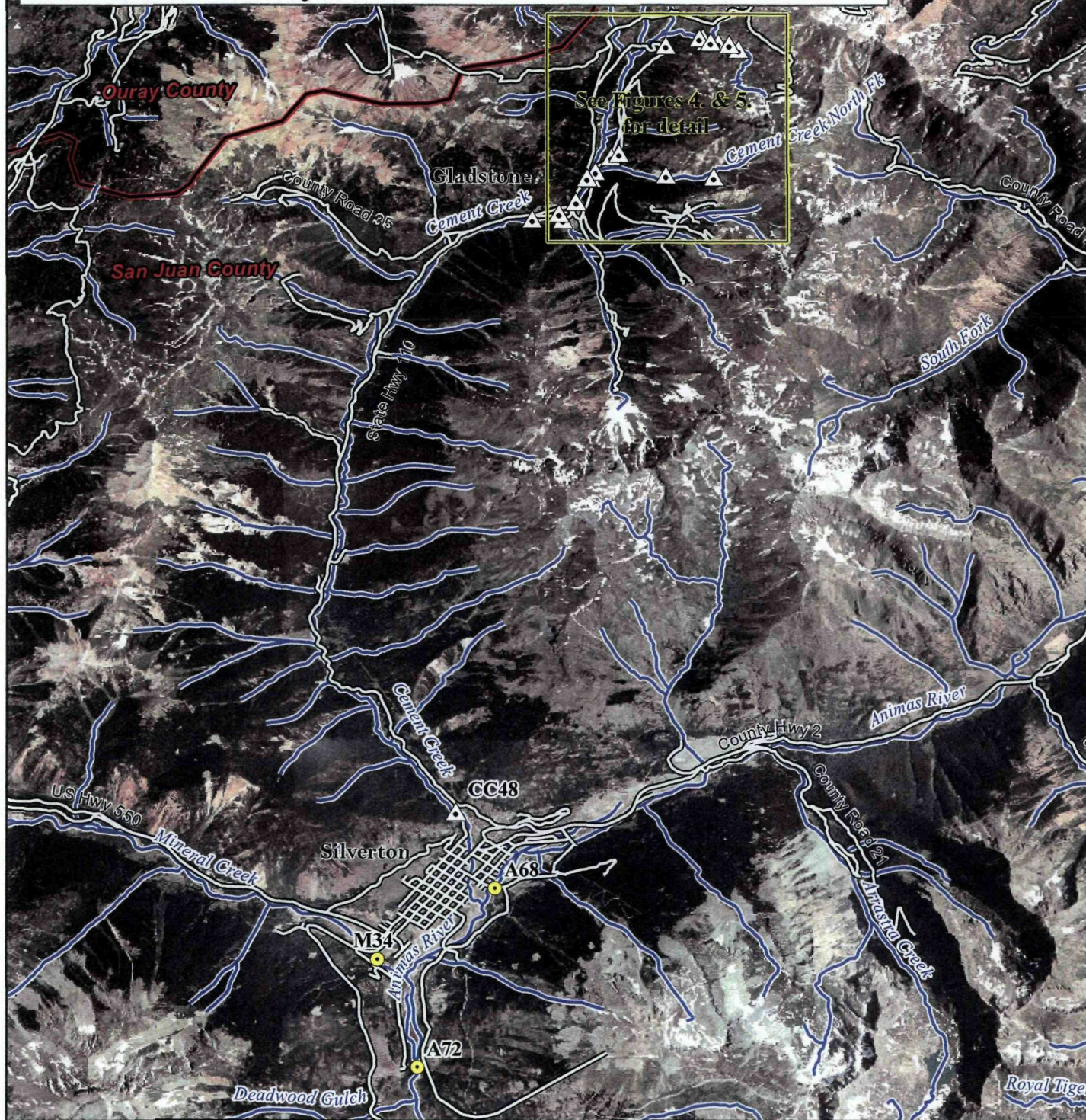
**Colorado**



**Area of Interest**



**Figure 2. Overview of Sample Locations  
Animas River, Mineral Creek, and Cement Creek  
San Juan County, Colorado**



- Animas River & Mineral Creek Sample Locations
- ▲ Cement Creek Sample Locations (Approximate due to Map Scale)
- Streets
- Rivers and Streams
- County Boundaries

0 1 2 Miles

**Date:** November 12th, 2009  
**Coordinate System/Projection:**  
 UTM Zone 13 North, NAD 83, Meters  
**Sources:**  
 Sample Locations - USEPA Region 8 and UOS (7/2009)  
 Streets: GDT (2006)  
 Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)  
 County Boundaries: U.S. Census Bureau, (2000)



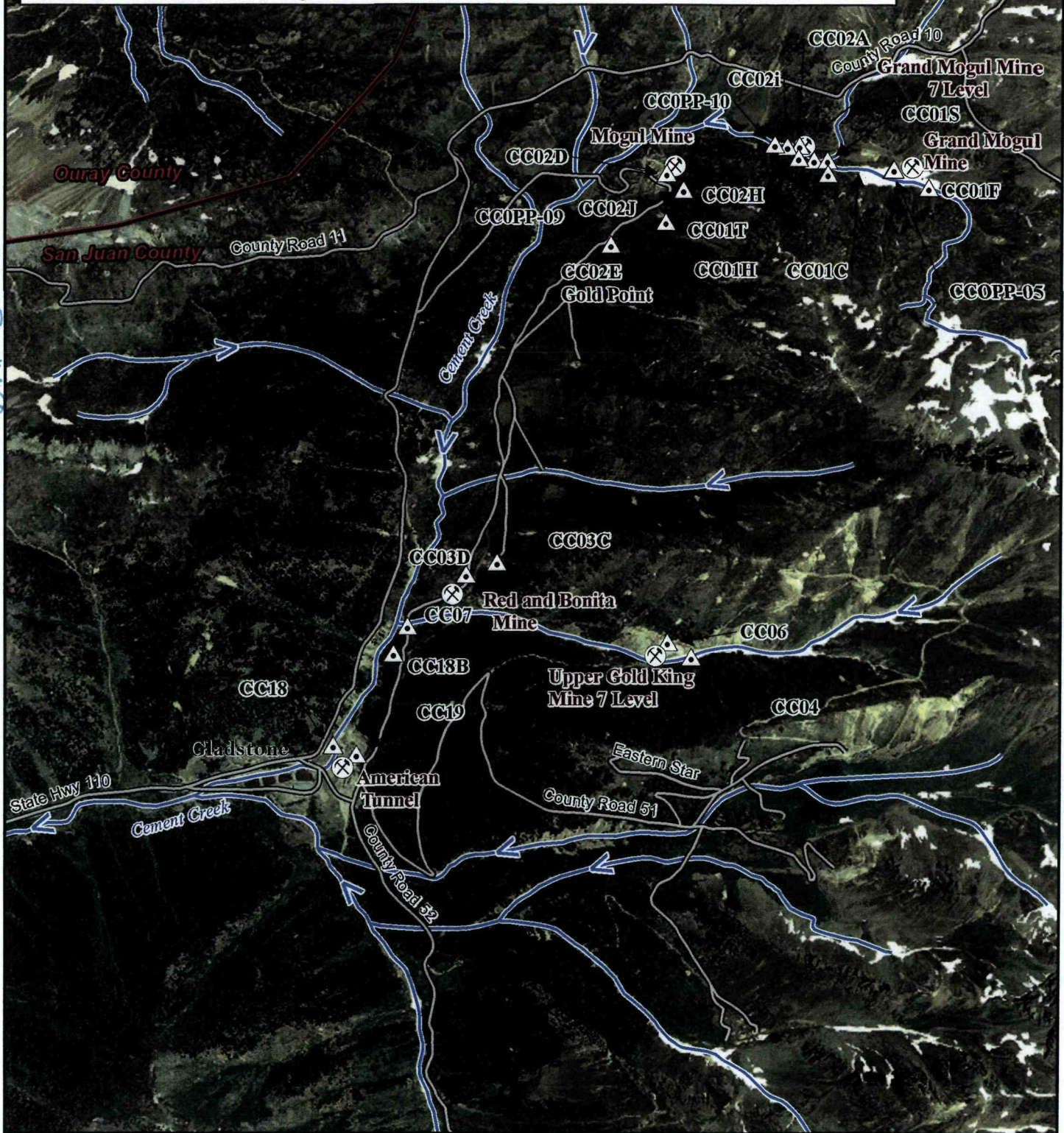
**Colorado**



**Area of Interest**



**Figure 4. Upper Cement Creek Sample Locations  
San Juan County, Colorado**



△ Cement Creek  
Sample Locations  
(Approximate due to Map Scale)

⊗ Mine Location

== Streets

~> Streams with Flow Direction

— County Boundaries

0 0.25 0.5 Miles

Date: November 12th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



TechLaw  
Creating a Better Future

Colorado

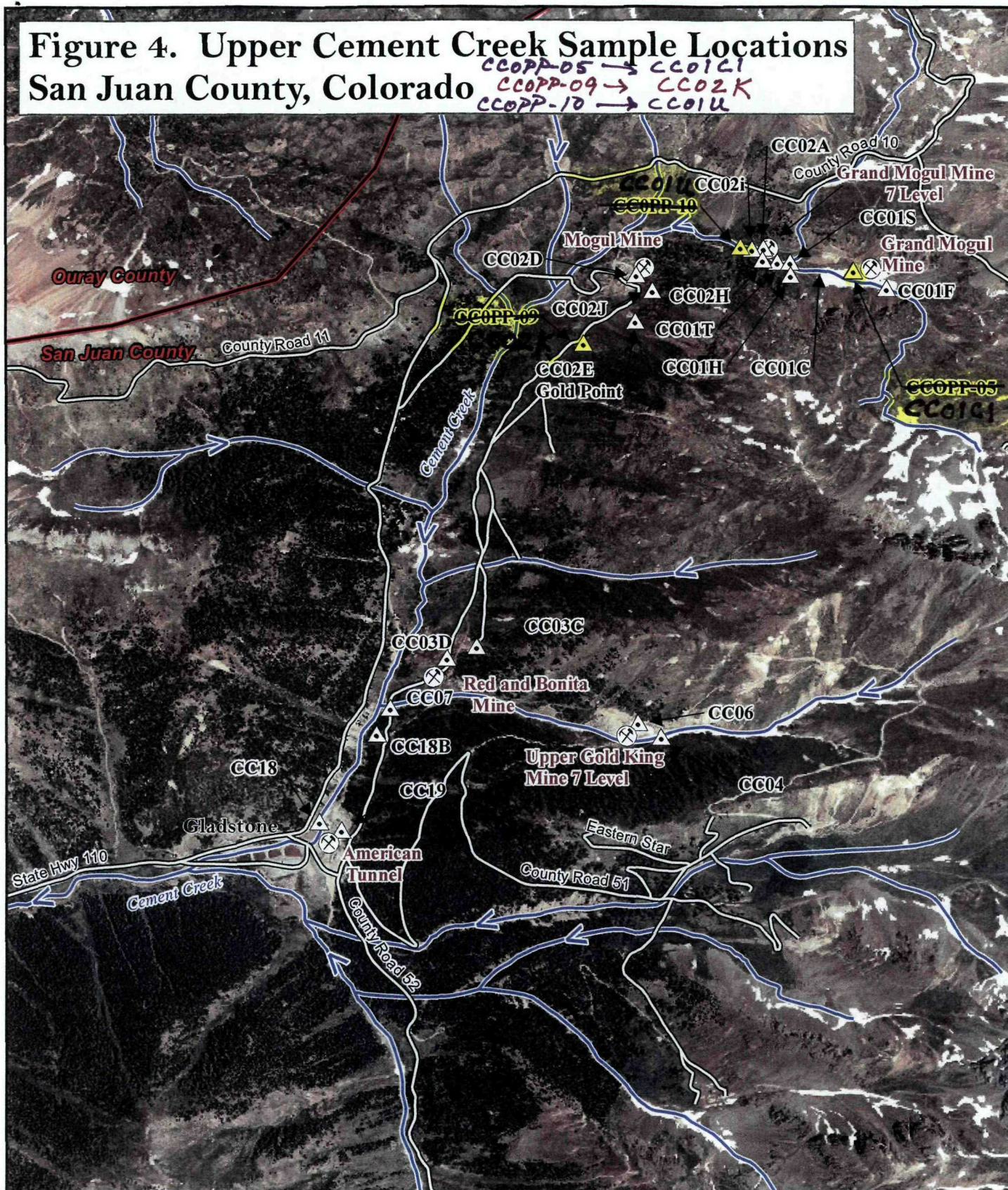


Area of Interest

CCOPP-05, 09, 10 needs two IDs from  
Bill Simon



**Figure 4. Upper Cement Creek Sample Locations  
San Juan County, Colorado**



△ Cement Creek  
Sample Locations  
(Approximate due to Map Scale)

⊗ Mine Location

== Streets

~> Streams with Flow Direction

— County Boundaries

0 0.25 0.5 Miles

Date: November 12th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



TechLaw

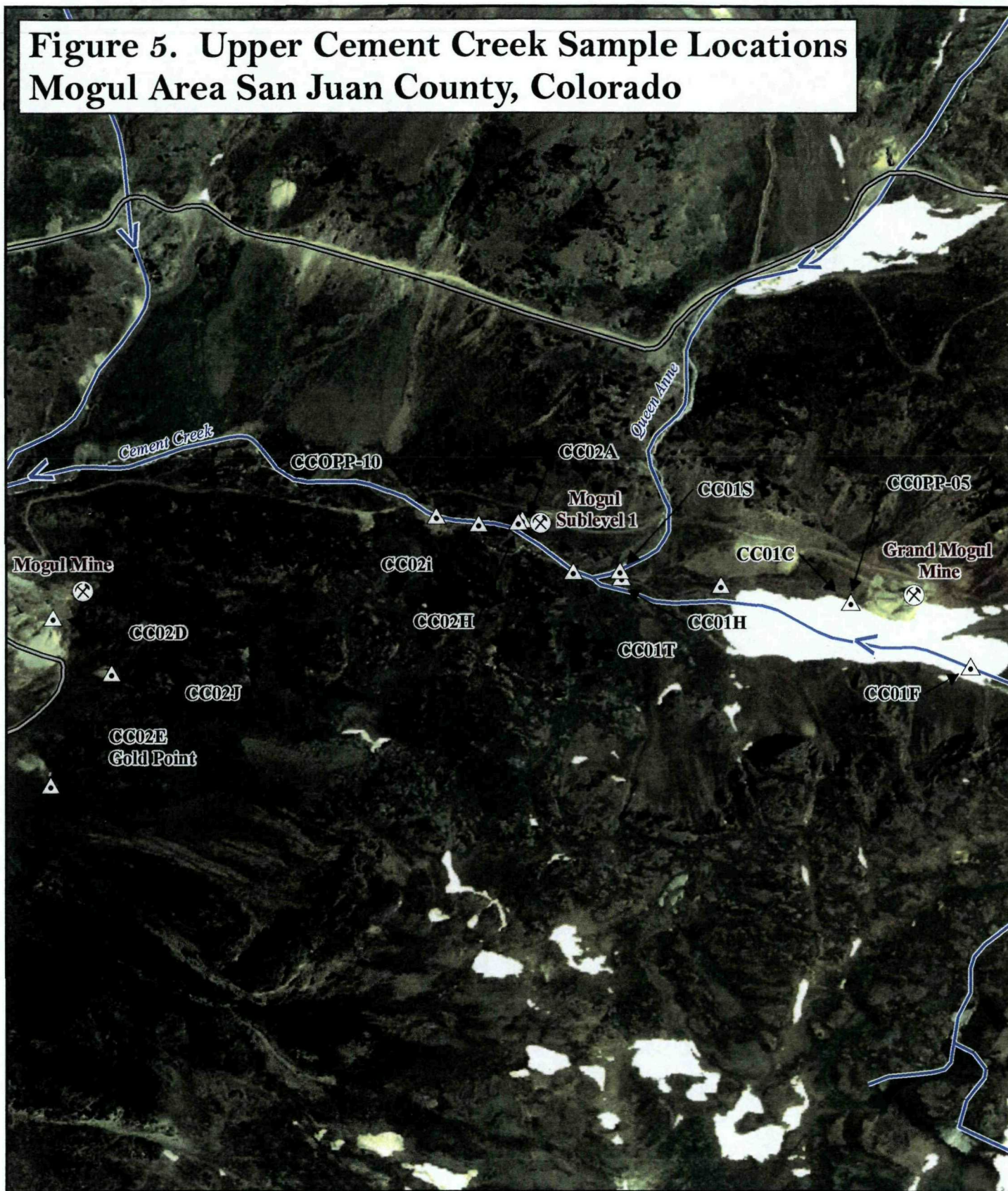
Colorado



Area of Interest



**Figure 5. Upper Cement Creek Sample Locations  
Mogul Area San Juan County, Colorado**



Cement Creek  
Sample Locations



Mine Location



Streets



Rivers and Streams



Stream Flow Direction

0 300 600 Feet

Date: November 12th, 2009  
Coordinate System/Projection:  
UTM Zone 13 North, NAD 83, Meters

**Sources:**

Sample Locations - USEPA Region 8 and UOS (7/2009)  
Streets: GDT 2006  
Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)  
County Boundaries: U.S. Census Bureau (2000)



**Colorado**



**Area of Interest**



**Figure 5. Upper Cement Creek Sample Locations  
Mogul Area San Juan County, Colorado**



Cement Creek  
Sample Locations



Mine Location



Streets



Rivers and Streams



Stream Flow Direction

0 300 600 Feet

Date: November 12th, 2009  
Coordinate System/Projection:  
UTM Zone 13 North, NAD 83, Meters

**Sources:**

Sample Locations - USEPA Region 8 and UOS (7/2009)  
Streets: GDT 2006  
Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)  
County Boundaries: U.S. Census Bureau (2000)



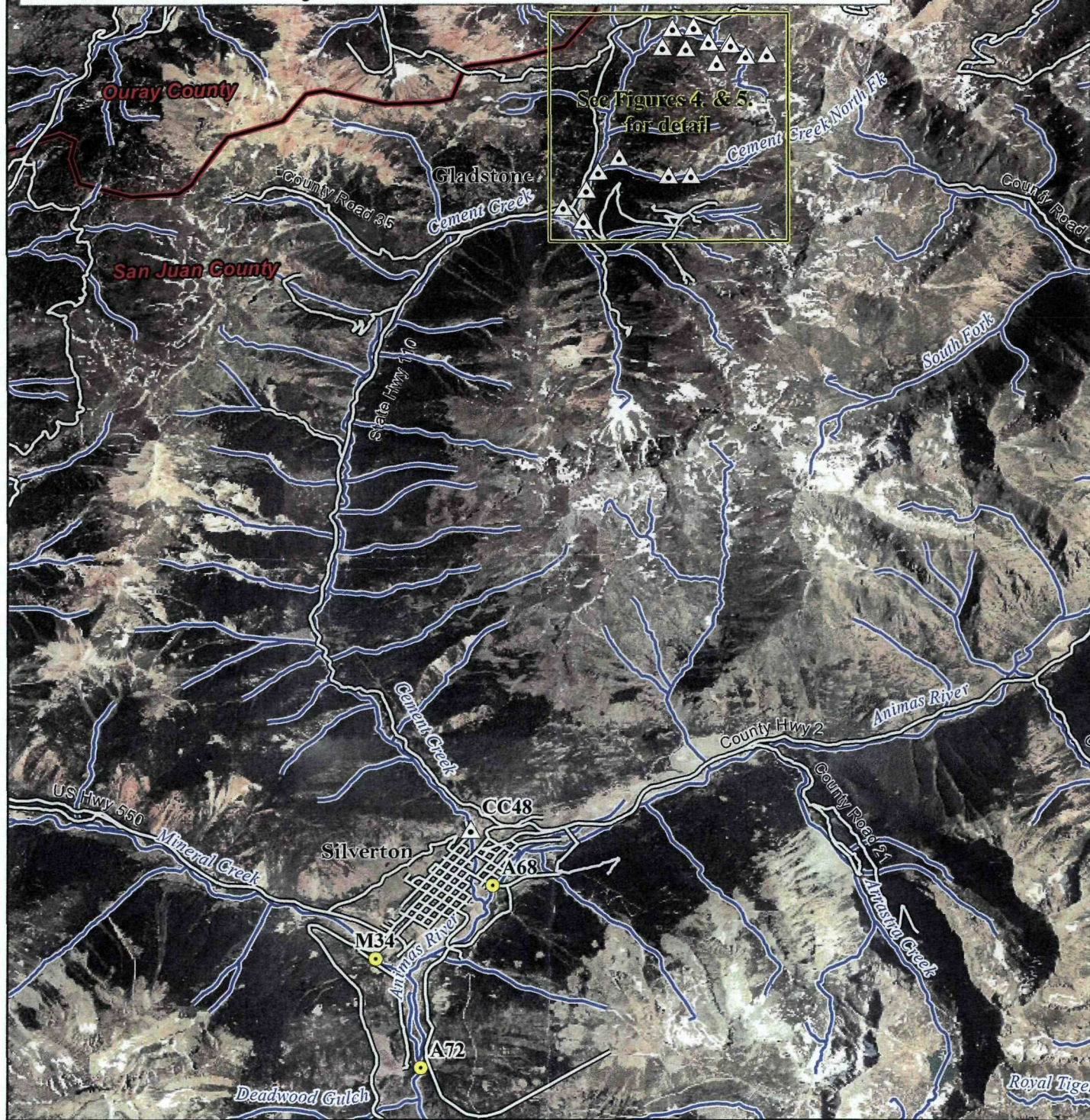
**Colorado**



**Area of Interest**



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Animas River, Mineral Creek, and Cement Creek  
San Juan County, Colorado**



- Animas River & Mineral Creek Sample Locations
- Cement Creek Sample Locations (Approximate due to Map Scale)
- Streets
- Rivers and Streams
- County Boundaries

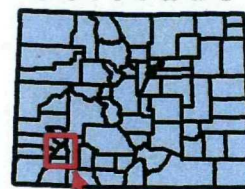
0 1 2 Miles

**Date:** August 5th, 2009  
**Coordinate System/Projection:**  
 UTM Zone 13 North, NAD 83, Meters  
**Sources:**  
 Sample Locations - USEPA Region 8 and UOS (7/2009)  
 Streets: GDT (2006)  
 Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)  
 County Boundaries: U.S. Census Bureau, (2000)



TechLaw

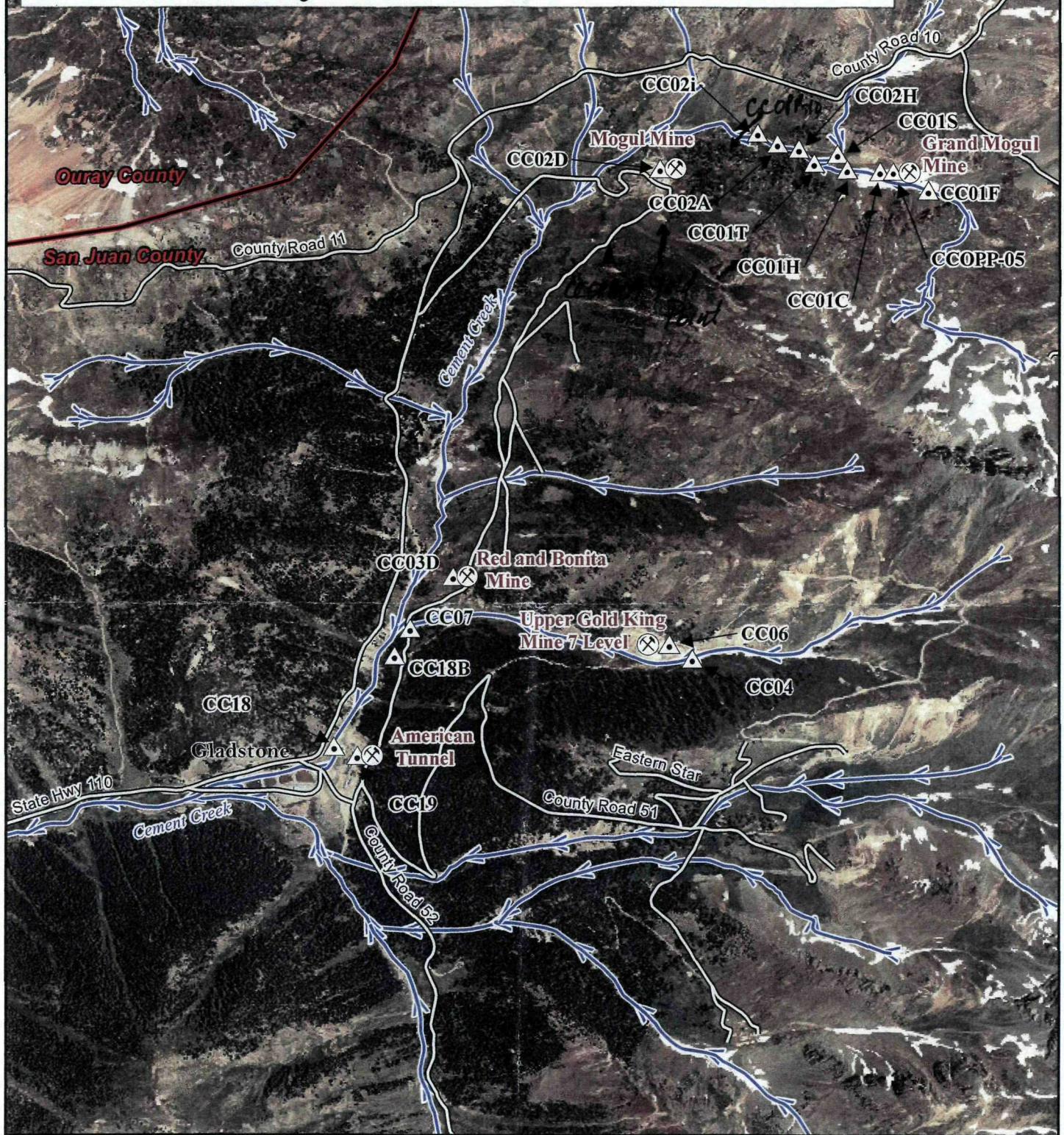
**Colorado**



**Area of Interest**



**Figure 4. Upper Cement Creek Sample Locations  
San Juan County, Colorado**



△ Cement Creek  
Sample Locations  
(Approximate due to Map Scale)

⊗ Mine Location

== Streets

~> Streams with Flow Direction

— County Boundaries

0 0.25 0.5 Miles

Date: August 5th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



TechLaw

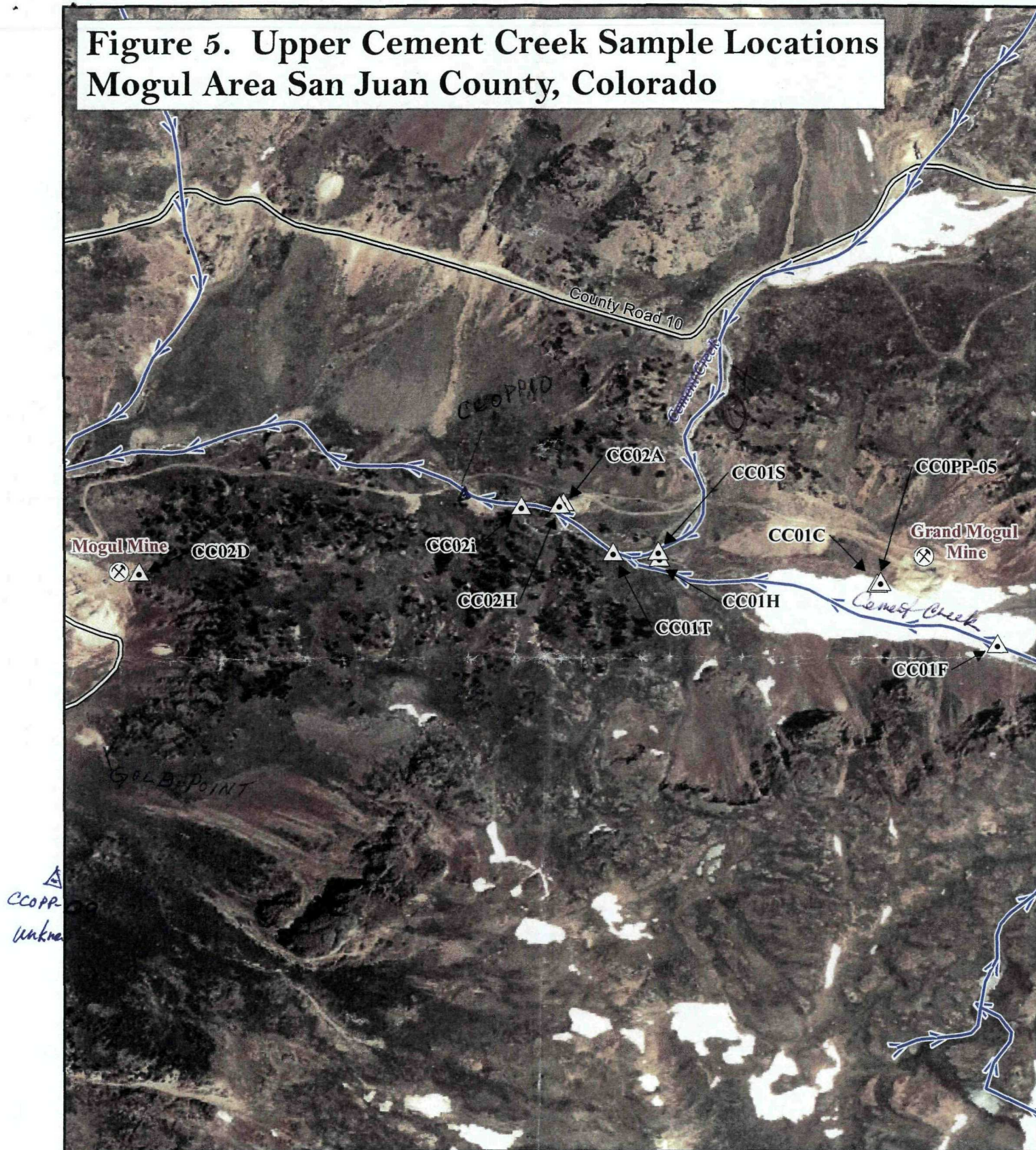
Colorado



Area of Interest



**Figure 5. Upper Cement Creek Sample Locations  
Mogul Area San Juan County, Colorado**



- Cement Creek Sample Locations
- Mine Location
- Streets
- Rivers and Streams
- Stream Flow Direction
- County Boundaries

0 250 500 Feet

Date: August 5th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (7/2009)

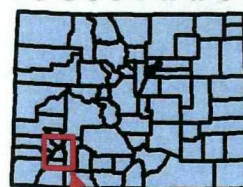
Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



**Colorado**



**Area of Interest**



## *Access Agreements*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
<http://www.epa.gov/region08>

**CONSENT FOR ACCESS TO PROPERTY**

**Name:** William A. Tookey, San Juan County Administrator  
Elyse Salazar, Silverton Town Administrator

**Location of Property:** Stream gauging or sampling locations within Silverton and San Juan County, Colorado 81433 that are on Town or County property.

This access agreement provides consent to officers, employees, and authorized representatives of the United States Environmental Protection Agency (EPA), Bureau of Land Management (BLM)/US Department of Agriculture (USDA-Forest Service), and their designees (contractors, Colorado Division of Reclamation, Mining, and Safety [DRMS], and Animas River Stakeholders Group [ARSG] entering and having continued access to the above referenced Properties for the following purposes:

1. Perform activities necessary for on-going routine water quality sampling;
2. Taking samples of surface soil, subsurface soil, or water on the Property;
3. Other such actions as may be necessary to provide for a safe working environment.

This Consent for Access is subject to the following conditions:

1. This consent for access is valid from signature until December 31, 2011.
2. Employees, and authorized representatives of the United States Environmental Protection Agency (EPA), Bureau of Land Management (BLM)/US Department of Agriculture (USDA-Forest Service), and their designees (contractors, Colorado Division of Reclamation, Mining, and Safety [DRMS], and Animas River Stakeholders Group [ARSG] are responsible for their own safety, and will abide by either the project wide Health and Safety Plan or follow individual corporate Health and Safety Plans.
3. Ultimately all data will be entered into the ARSG and EPA STORET databases. Interim progress and result reports of the water quality sampling activities will be given at ARSG monthly meetings.

William A. Tookey  
Signature

5/13/09  
Date

970-387-5766  
Phone Number

\_\_\_\_\_ I would like EPA to provide me with a portion of the sample, called a "split sample," for my own analysis. I will provide sample containers for split sample analysis.

\_\_\_\_\_ I would like to be present during sampling. My daytime phone number is\_\_\_\_\_.

\_\_\_\_\_ I would like to receive a copy of the analytical results. My mailing address is  
\_\_\_\_\_.

Comments:

EPA will be conducting the sampling and analysis pursuant to its authority under Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §9601 et seq. If you have questions, please contact Sabrina Forrest of EPA at 303-312-6484.







UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
<http://www.epa.gov/region08>

**CONSENT FOR ACCESS TO PROPERTY**

**Name:** Todd C. Hennis, San Juan Corp., and Salem Minerals, Colorado Goldfields, Inc. (hereinafter, jointly, the "Cooperating Parties.")

**Location of Properties:** Todd C. Hennis/San Juan Corp./Salem Minerals, Colorado Goldfields, Inc.' lands on or near the Gladstone area, including the Ixion Claim, Harrison Mill Site, Anglo Saxon Lode, and the Upper Gold King 7 Level mine (the Properties).

The Cooperating Parties, owners of the Properties, consent to officers, employees, and authorized representatives of the United States Environmental Protection Agency (EPA), Bureau of Land Management (BLM)/US Department of Agriculture (USDA-Forest Service), and their designees (contractors, Colorado Division of Reclamation, Mining, and Safety [DRMS], and Animas River Stakeholders Group [ARSG] entering and having continued access to the above referenced Properties for the following purposes:

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25 April 2009

Name C. Stephen Guyer for Colorado Goldfields Inc.

Date



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# San Juan Corp.

P.O. Drawer I  
Silver Plume, CO 80476  
Tel. 303-569-0155  
Fax 303-569-0156

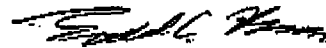
U.S.E.P.A. -Denver  
Attn: Sabrina Forest

January 13, 2010-01-13

Sabrina-

Here is the signed access agreement.

For San Juan Corp.



Todd C. Hennis, Pres.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
<http://www.epa.gov/region08>

**CONSENT FOR ACCESS TO PROPERTY**

**Name:** Todd C. Hennis, San Juan Corp., and Salem Minerals, hereinafter, jointly, the "Cooperating Parties."

**Location of Properties:** Todd C. Hennis/San Juan Corp./Salem Minerals lands on or near the Gladstone area, including the Ixion Claim, Harrison Mill Site, Anglo Saxon Lode, and the Upper Gold King 7 Level mine portal, Mogul mine portal, and the Grand Mogul mine portal (the Properties).

The Cooperating Parties, owners of the Properties, consent to officers, employees, and authorized representatives of the United States Environmental Protection Agency, (EPA), Bureau of Land Management (BLM)/US Department of Agriculture (USDA-Forest Service), specifically, Barbara Hite, Brent Lewis, Kay Zillich, Lisa Richardson, and their designees (contractors, Colorado Division of Reclamation, Mining and Safety [DRMS], and Animas River Stakeholders Group [ARSG], including Debbie Cokes, entering and having continued access to the above referenced Properties for the following purposes:

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3. Ultimately all data will be entered into the ARSG and EPA Storet databases. Interim progress and result reports of the water quality sampling activities will be given at ARSG monthly meetings.

For San Juan Corp. and Salem Minerals Inc.,

Todd C. Hennis, PRES AND- Todd C. Hennis  
Name

1-13-10  
Date



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# San Juan Corp.

P.O. Drawer I  
Silver Plume, CO 80476  
Tel. 303-569-0155  
Fax 303-569-0156

To: EPA  
Attn: Sabrina Forrest

May 12, 2009

Here's the Consent for Access. I made a couple of minor modifications.

For San Juan Corp.



Todd C. Hennis, Pres.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

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DENVER, CO 80202-1129  
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For San Juan Corp and Salem Minerals Inc.,

Todd C. Hennis PRESIDENT  
Name AND INDIVIDUALS

5-12-09  
Date



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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
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For San Juan Corp. and Salem Minerals Inc.,

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date



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SAT

CCOPD2 added  
on N Fork CC just  
above CC6 inflow  
CC4D2 is not  
a gauge

participation to L'Esperance  
L'Esperance - all equipment; as usual

## Gladstone, San Juan County, Colorado

June 09  
added OPP-03  
OPP-04  
OPP-05  
at Grand Regal

12

Ten 10/13

Date \_\_\_\_\_

Date 4/30/09

Date \_\_\_\_\_

Date 04/08/09



## Baseline Sampling and Analysis Plan for Upper Cement Creek Water Quality Characterization

Gladstone, San Juan County, Colorado

April 8, 2009

Prepared and revised by Sabrina Forrest, US Environmental Protection Agency  
for the Animas River Stakeholders Group  
Reviewed by William Simon, ARSG  
and Steve Fearn, ARSG

Approved by \_\_\_\_\_  
Animas River Stakeholders Group

Date \_\_\_\_\_

Approved by \_\_\_\_\_  
BLM/USFS

Date \_\_\_\_\_

Approved by K. S. Brown  
CDPHE/DRMS

Date 4/14/09

Approved by \_\_\_\_\_  
EPA, Ecosystems Protection and Remediation

Date \_\_\_\_\_

## Baseline Sampling and Analysis Plan for Upper Cement Creek Water Quality Characterization

Gladstone, San Juan County, Colorado

April 8, 2009

Prepared and revised by Sabrina Forrest, US. Environmental Protection Agency  
for the Animas River Stakeholders Group  
Reviewed by William Simon, ARSG  
and Steve Fearn, ARSG

Approved by William Simon Date 5/21/09  
Animas River Stakeholders Group

Approved by \_\_\_\_\_ Date \_\_\_\_\_  
BLM/USFS

Approved by Kris R Date 5/20/09  
CDPHE/DRMS

Approved by Sabrina Forrest Date 04/08/09  
EPA, Ecosystems Protection and Remediation

## **DISTRIBUTION LIST**

ARSG Project Manager and QA Manager:	William Simon
BLM/USFS Project Manager:	Stephanie Odell
EPA Project Manager:	Sabrina Forrest
CDPIIE/DRMS Project Manager:	Camille Price
Others:	ARSG Monitoring Work Group

**The project team for these sampling events includes the following stakeholders:**

Animas River Stakeholder Group (ARSG)  
Bureau Of Land Management (BLM)  
Colorado Department of Public Health and Environment, Hazardous Materials & Waste Management Division (HMWMD)  
Colorado Department of Public Health and Environment, Water Quality Control Division  
Colorado Division of Reclamation, Mining & Safety  
Colorado Goldfields  
Gold King Mines Corp. (GKM)  
Salem Minerals Inc. (SMI)  
San Juan Corp. (SJC)  
San Juan County  
Silver Wing Company Inc. (SWC)  
Sunnyside Gold Company (SGS)  
USDA Forest Service (USFS)  
U.S. Environmental Protection Agency (EPA)  
U.S. Geological Survey (USGS)

## Baseline Sampling and Analysis Plan for Upper Cement Creek Water Quality Characterization

Gladstone, San Juan County, Colorado

April 8, 2009

Prepared and revised by Sabrina Forrest, US. Environmental Protection Agency  
for the Animas River Stakeholders Group  
Reviewed by William Simon, ARSG  
and Steve Fearn, ARSG

Approved by William Simon  
Animas River Stakeholders Group

Date 5/21/09

Approved by \_\_\_\_\_  
BLM/USFS

Date \_\_\_\_\_

Approved by KRS R  
CDPHE/DRMS

Date 5/20/09

Approved by Sabrina Forrest  
EPA, Ecosystems Protection and Remediation

Date 04/08/09

## **DISTRIBUTION LIST**

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BLM/USFS Project Manager:	Stephanie Odell
EPA Project Manager:	Sabrina Forrest
CDPHE/DRMS Project Manager:	Camille Price
Others:	ARSG Monitoring Work Group

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Colorado Division of Reclamation, Mining & Safety  
Colorado Goldfields  
Gold King Mines Corp. (GKM)  
Salem Minerals Inc. (SMI)  
San Juan Corp. (SJC)  
San Juan County  
Silver Wing Company Inc. (SWC)  
Sunnyside Gold Company (SGS)  
USDA Forest Service (USFS)  
U.S. Environmental Protection Agency (EPA)  
U.S. Geological Survey (USGS)

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## **ATTACHMENTS**

- Attachment 1      Surface Water Sampling and Stream Discharge Form
- Attachment 2      Chain-of-Custody Form
- Attachment 3      SOP for Filtration
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- Attachment 5      Animas River Watershed QA Corrective Action Request

## 1.0 INTRODUCTION/TASK ORGANIZATION

The Animas River Stakeholders Group (ASRG) in cooperation with the U. S. Environmental Protection Agency (USEPA), Federal Land Management Agencies (FLMA) including the Bureau of Land Management (BLM) and the US Forest Service (USFS), the Colorado Department of Public Health and Environment, the Colorado Department of Natural Resources, Division of Reclamation, Mining and Safety (DRMS) and other participating stakeholders will coordinate sampling select locations in upper Cement Creek, near the historic town site of Gladstone. These sampling events will be completed using a variety of funding sources and technical expertise provided by the above-mentioned ARSG members. Funding may include a potential NPS 319 grant provided by the Colorado Water Quality Control Division (WQCD) provided to the Animas River Stakeholders Group. Bill Simon is the Watershed Coordinator and Project QA Manager for the ASRG and this project. Trained personnel from member organizations of the ARSG will collect water quality samples and flow measurements. Samples will be analyzed by EPA's Lab in Denver. Results will be entered into the publicly available database maintained by the ASRG, and into EPA's STORET database. Previous sampling in 2005 and 2006 provided several water quality data points from upper Cement Creek locations; however, the ARSG Monitoring Work Group has identified the need for additional data to assist stakeholders' decision-making processes. ARSG participants will be data keepers and users but decision makers will be landowners/operators, FLMA, the EPA, CDPHE, and DRMS.

Mobilization and watershed sampling activities are scheduled to be performed on a monthly basis; however the ARSG recognizes that safety, primarily due to potential weather and avalanche danger, will limit access to sampling sites during some months. At a minimum, monthly sampling during high and low flow conditions would be optimal in order to characterize annual and seasonal variability. The data generated by these sampling events will be validated by the EPA and then submitted to the ARSG for report generation and presentation to the ARSG workgroup and others.

This Baseline Sampling and Analysis Plan (SAP) has been prepared in accordance with the EPA *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*, *Requirements for Quality Assurance Project Plans (QA/R-5)* and the *Guidance for Quality Assurance Project Plans (EPA QA/G-5)*, (U.S. Environmental Protection Agency (EPA) 2006; EPA 2001; EPA 2002). This SAP is designed to guide field work that will include the collection of surface water samples and flow measurements from up to 17 locations, including field Quality Assurance/Quality Control (QA/QC) samples. If field personnel observe conditions that warrant collection of opportunistic seep or spring samples, then those may also be collected.

Laboratory analyses will include total and dissolved Target Analyte List (TAL) metals, anions (fluoride, chloride, nitrate/nitrite-N low level, sulfate, acidity (as  $\text{CaCO}_3$ ), hardness (calculated from calcium and magnesium concentrations in the dissolved ratio), total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and total dissolved solids (TDS). Laboratory method detection limits will be below selected standards and applicable benchmarks (Table 4). All samples will be analyzed either through the EPA Region 8 Laboratory or an EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS) laboratory. Field-collected measurements of aqueous samples will include temperature, pH, specific conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and flow measurements.



**(EPA Region 8 Technical Standard Operating Procedures (TSOPs) or Minimum Field Requirements, EPA 1996)**

Field work will include sampling and non-sampling data collection. Sampling procedures will adhere strictly to those outlined in the attached EPA Region 8 TSOPs and Minimum Field Requirements for field operations (EPA 1996). This Baseline SAP is intended to be the primary document for these routine sampling events and can be used in conjunction with the EPA "Generic Quality Assurance Project Plan for the Upper Animas Watershed" (In development). Deviations in the field will be documented on field sheets and in the Project Summary Report. Deviations that result in major modifications to the Baseline SAP will be noted and incorporated into all Addenda to the SAP, which will be followed for subsequent sampling events. A brief Addendum to the SAP will be created for each subsequent sampling events by updating applicable Figures, Tables, and Attachments; resubmitting a Laboratory Services Request to the EPA Region 8 Lab; and updating the Project Health and Safety Plan (HASP).

## **2.0 HISTORY AND LAND USE**

The discovery of gold and silver brought miners to the Silverton area and Animas Mining District in the early 1870's. The discovery of silver in the base-metal ores was the major factor in establishing Silverton as a permanent settlement. Between 1870 and 1890, the richer ore deposits were discovered and mined to the extent possible. Not until 1890 was any serious attempt made to mine and concentrate the larger low-grade ore bodies in the area. By 1900, there were 12 concentration mills in the valley sending products to the Kendrick and Gelder Smelter near the mouth of Cement Creek. Mining and milling slowed down circa 1905, and mines were consolidated into fewer and larger operations with the facilities for milling large volumes of ore. After 1907, mining and milling continued throughout the basin whenever prices were relatively favorable.

Gladstone, located about eight miles upstream of Silverton on Cement Creek, is the site of an historic mining town that developed in the 1880s with the advent of mining in the surrounding area (Figures 1 and 2). The town was the central location and railroad terminus for the milling and shipping of mine ores from the surrounding three-square-mile valley. The town declined in the 1920 s and no remnants of the town remain. By the 1970's only one year round producing mine (Sunnyside Mine) remained in the county. This mine ceased production in 1991, and has since undergone extensive reclamation efforts. The Gold King Mine's permit with DRMS is currently in inactive status; however, landowners hope to rehabilitate the mine beginning in 2009. Both the Sunnyside and Gold King properties were partially accessed through the American Tunnel that has its portal in Gladstone (San Juan County, 2005).

Previously the American Tunnel drained as much as 1,600 gallons per minute (gpm) of water from the mines. A lime feed and settling pond type treatment facility was constructed in Gladstone in 1979 by Standard Metals Corporation. Water discharging from the American Tunnel was treated as required by the water discharge permit. The facility operations and mine ownership was later transferred to the Sunnyside Gold Corporation (SGC). Under jurisdiction of a court consent decree to terminate their discharge permit, SGC installed several bulkheads within the Sunnyside Mine that greatly reduced the amount of discharge from the American Tunnel. Seventy to one hundred gpm continue to discharge presumably from near surface groundwater. All terms of the consent decree were met by SGC in 2002.

In January 2003 the treatment facility, operations, and permit were transferred to Gold King Mines Corp. The settling ponds were deeded to San Juan Corp. by SGC prior to the lease between Gold King Mines Corp. and San Juan Corp. The treatment facility continued to treat the remaining American Tunnel discharge and the Gold King discharge until September 2004. San Juan Corp. required SGC to reclaim the four settling ponds (completed in 2005) following termination of the San Juan Corp. abd SGC lease. Gold King Mines Corp. was subsequently evicted and the balance of Gold King Mines Corp. land was acquired by San Juan Corp. as the lien holder. The American Tunnel portal reclamation and removal of some out buildings was completed in 2006. The BLM manages the land associated with the American Tunnel portal and some land beyond the portal; however, San Juan Corp. owns the majority of the land surrounding the portal.

Numerous historic and now abandoned mines exist within a two-mile radius of Gladstone. They include: the Upper Gold King 7 level, American Tunnel, Grand Mogul, Mogul, and Red and Bonita, Evelyne, Henrietta, Joe and John, and Lark mines (Figure 1). Some of these mines have acid mine drainage that flows between 30 and 300 gpm directly or indirectly into Cement Creek and eventually into the Animas River, the confluence of which is about eight miles downstream of Gladstone (San Juan County, 2005). The ARSG, BLM, DRMS and private stakeholders have completed remediation projects at the Evelyne, Henrietta, Joe and John, and Lark mines. The remaining sites located in the Cement Creek drainage that will be the focus of these sampling efforts include the American Tunnel, Grand Mogul, Mogul, Red and Bonita, and the Upper Gold King 7 level.

### **3.0 DATA QUALITY OBJECTIVES**

The EPA Data Quality Objectives (DQO) Process is a seven-step systematic planning approach to develop acceptance or performance criteria for EPA-funded projects. The following DQOs were developed by EPA with input from ARSG members and are based on evaluating existing watershed data and the ARSG identifying significant water quality data gaps.

#### **3.1 Step 1: Problem Definition/Objectives**

The Animas River and many of its tributaries above Silverton carry high concentrations of metals from both mining and natural sources. The ASRG and its member entities have undertaken extensive sampling to characterize the water quality of the upper Animas Basin, and prioritize locations where treatment could result in better water quality. The ARSG was responsible for assembling and analyzing all physical, chemical, and biological watershed information. They crafted the extensive Use Attainability Analysis for the Animas River Watershed, which was used to help the WQCC develop appropriate stream standards and TMDL throughout the watershed (ARSG, 2001). The adopted standards are based upon a combination of expected metal concentration reductions brought about by the remediation of 67 of the worse polluting mine sites and the biological potentials of the receiving streams.

Cement Creek, the receiving stream for the discharge of the American Tunnel and other mine drainages in the immediate area is unable to support aquatic life. Cement Creek is a major contributor of metals and acidity to the Animas River that has goal-based cold water aquatic life standards. Presently 15 TMDL allocations are not being met for Cement Creek and the Animas River below Cement Creek's confluence (San Juan County, 2005). Major contaminants of

concern (COCs) have been identified by the Animas River Stakeholders Group and include aluminum, cadmium, copper, iron, manganese, and zinc. Lead is also listed as a COC for the Cement Creek TMDL.

During monthly ARSG meetings, attendees recognized that conditions have been changing over the last three years at several of the worst sources of mining-impacted waters (MIW) in upper Cement Creek. For example, flows have been increasing at the Red and Bonita mine and the upper Gold King 7 level. In addition, data trends tracked by the ARSG show increased concentration of aluminum, cadmium, copper, manganese and zinc observed in Cement Creek and downstream in the mainstem of the Animas River (A72) in the years 2005 through 2007. These increases have coincided with the 2005 cessation of active water treatment in Gladstone. Therefore, additional characterization is needed to determine seasonal and annual variability in water quality and metals loads.

The objectives for these sampling efforts will be to:

- Collect monthly water samples and flow measurements; and
- Assess changes in water quality and metals loads over time.

### **3.2 Step 2: Identifying the Decisions**

The principal study questions (PSQ) for the Animas River Stakeholders Group are:

- PSQ1 - What are the seasonal and annual variability in water chemistry, metals loads, and discharges from the upper Cement Creek sources of MIW sources?
- PSQ2 - Can the Cement Creek water quality data be used to quantify impacts to the Animas River?
- PSQ3 - Are there additional seeps and springs emanating and impacting loads in Cement Creek and the Animas River;
- PSQ4 - Can it be determined if, and when equilibrium has been reached in this portion of the watershed?
- PSQ5 - Can these data support stakeholder input and decisions on the future design and cost estimates for a water treatment system?
- PSQ6 - Can these data support stakeholder input and decisions on a possible micro hydroelectric power plant to be used to power a water treatment system?

### **3.3 Step 3: Identifying Information and Decision Inputs**

The primary information and decision inputs will be data generated from field instruments and laboratory analyses, as well as water quality standards for comparison.

Field parameters and non-sampling objectives include:

- Taking temperature, pH, specific conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and flow measurements or estimates; and

- Photographing the sampling locations and other notable observations.

Analytical laboratory parameters for routine and opportunity aqueous samples will include:

- Total and dissolved Target Analyte List (TAL) metals, anions (fluoride, chloride, nitrate/nitrite-N low level, sulfate, acidity (as  $\text{CaCO}_3$ ), hardness (calculated from calcium and magnesium concentrations in the dissolved ratio), total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and total dissolved solids (TDS). Laboratory method detection limits will be below selected standards and applicable benchmarks (Table 4).
- Metals results for aqueous samples will be compared to existing ambient standards for Cement Creek and water quality standards set for the Animas River TMDL compliance point at A72.

The following factors will be evaluated in the overall decision-making process:

- ◆ Water quality characteristics from sample data;
- ◆ Comparison of field parameters and laboratory analytical data from MIW sources to historic concentrations and to the appropriate "bracket" sampling location;
- ◆ Comparison of analytical data to applicable standards/benchmarks/water quality criteria: TMDLs, Segment-specific Water Quality Standards, and Colorado Table Value Standards;
- ◆ Ability to meet TMDLs and/or water quality standards;
- ◆ Reduced metals and acid loading to Cement Creek and the Animas River from high concentration low volume sources;
- ◆ Costs associated with various water treatment system types;
- ◆ Land ownership, landowner, or third-party participation in water treatment system construction, operation, and maintenance
- ◆ Potential treatment of multiple mine discharge sources; or treatment of a larger more dilute Cement Creek flows; or some combination of both.

### **3.4 Step 4: Defining the Study Boundaries**

The study area boundary comprises the Animas River from TMDL compliance point A72 upstream to the upper Cement Creek drainage. Sources include mining-impacted discharges from inactive or abandoned mines within approximately two miles of the historic Gladstone townsite. These are the Gold King 7 level, the American Tunnel, the Red & Bonita, Mogul, and Grand Mogul. If seeps or springs are identified that will help discern flows into and out of the Cement Creek drainage, they may also be sampled.

ARSG members will sample these sources monthly or bimonthly, depending on access and weather conditions. However, capturing representative high flow and low flow conditions will be the primary objective. High flow is generally during the May and June months and low flow conditions are typically during October through April. The ARSG would like to collect at least two years of data to help answer the study questions outlined above.

### 3.5 Step 5: Developing a Decision Rule

The ARSG will conduct routine sampling at the Animas River TMDL compliance point (A72) to characterize sources and metal loads within the upper Cement Creek drainage and their impact to the compliance point. No decision rule is required for the individual field sampling events, since these data will help create a data set from which the ARSG, landowners, and other stakeholders will make decisions. However, the data and information review process will give the ARSG and other stakeholders the information on at least a semi-annual basis from which to assess the statements below. If, after two years of data collection, the ARSG does not have a complete data set showing seasonal and annual trends, or if data indicate that equilibrium has still not been reached, then another year of monthly sampling may be determined by the ARSG to be appropriate.

- Decision Rule for PSQ1 – Alternative 1: If the seasonal and annual variability in metals loads and discharges from the upper Cement Creek sources of MIW sources are not understood, then additional routine monitoring will take place.
- Decision Rule for PSQ1 – Alternative 2: If the seasonal and annual variability in metals loads and discharges from the upper Cement Creek sources of MIW sources are understood, then what remedial alternatives supporting PSQ5 and PSQ6 can be explored or implemented?
- Decision Rule for PSQ2 – Alternative 1: If the Cement Creek water quality data cannot be used to quantify seasonal and annual impacts to the Animas River, then additional sampling will be needed.
- Decision Rule for PSQ2 – Alternative 2: If the Cement Creek water quality data can be used to quantify seasonal and annual impacts to the Animas River, then additional sampling will not be needed.
- Decision Rule for PSQ3 – Alternative 1: If additional seeps and springs are not observed emanating and impacting loads in Cement Creek and the Animas River, then they will not be sampled nor measured. (Anticipated during winter and low flow months).
- Decision Rule for PSQ3 – Alternative 2: : If additional seeps and springs are observed emanating and impacting loads in Cement Creek and the Animas River, then they will be sampled and measured. . (Anticipated during spring/ summer and high flow months).
- Decision Rule for PSQ4 – Alternative 1: If it cannot be determined that equilibrium has been reached in this portion of the watershed, then additional monitoring will take place.
- Decision Rule for PSQ4 – Alternative 2: If it can be determined that equilibrium has been reached in this portion of the watershed, then additional monitoring will not be needed.

- Decision Rule for PSQ5 – Alternative 1: If these data don't support stakeholder input and decisions on the future design and cost estimates for a water treatment system, then what additional data are needed?
- Decision Rule for PSQ5 – Alternative 2: If these data support stakeholder input and decisions on the future design and cost estimates for a water treatment system, then which system will be recommended?
- Decision Rule for PSQ6 – Alternative 1: If these data don't support stakeholder input and decisions on a possible micro hydroelectric power plant to be used to power a water treatment system, then is there additional data needed to move forward?
- Decision Rule for PSQ6 – Alternative 2: If these data support stakeholder input and decisions on a possible micro hydroelectric power plant to be used to power a water treatment system, then which system will be implemented; also, who will operate and maintain the plant?

### **3.6 Step 6: Defining Tolerance Limits On Decision Errors**

Due to the lack of data points from MIW sources in upper Cement Creek, statistical evaluation will not take place until several rounds of data have been collected. Judgmental sampling will be used to collect aqueous samples that are representative of MIW sources, discharges that bracket the American Tunnel MIW source, and the downstream gauging stations that will help quantify Cement Creek inputs to the Animas River at and above TMDL compliance point A72. Depending on the sampling location, field personnel may need to collect depth-integrated samples in order to obtain representative samples.

All sampling activities will be conducted according to EPA TSOPs, which will be attached to the SAP and Addenda to the SAP. All analytical data will be reviewed, verified, and validated to ensure data are acceptable for their intended use (EPA 2002).

For the sampling events, the ARSG will focus on the locations that are shown in Figures 2 through 4 and listed in Table 1. The field-collected data will be reviewed by the ARSG Coordinator for representativeness and completeness. The laboratory data will be validated by an independent chemist to ensure that the quality of the data is adequate for the intended purpose. The data quality indicators will then be evaluated and a determination will be made as to whether the overall quality of the data is acceptable for use in calculating metals loading at each location.

The Quality Assurance/Quality Control (QA/QC) samples that will be collected and evaluated to determine the quality of the data will include a duplicate surface water sample, a field blank, and triple volume surface water for laboratory spike and laboratory duplicate spike samples. The data acceptance criteria to be evaluated include precision, accuracy/bias, sensitivity, comparability, representativeness, and completeness (See Section 8).

### **3.7 Step 7: Optimizing the Sample Design**

The purpose of this step is to design sample collection in such a way as to meet the DQOs outlined above. Sample locations will be field located by the project manager or leader of the field sampling crew based upon an understanding safe access to existing sampling locations, known environmental conditions, and confirmation of known latitudes and longitudes. The activities of this step are described in Sections 4.0 through 6.0.

## **4.0 FIELD ACTIVITIES**

### **4.1 Concept of Operations**

#### **4.1.1 Schedule**

The first field sampling event is scheduled for April 2009. Sampling is estimated to be completed within one week. Bi-Monthly sampling events will follow the initial event; however, they will be based on safe access to the sampling locations. The last sampling event is scheduled for spring 2011; however, that may change based on the amount of data collected and the stakeholder input on the data quality up to that point. Non-sampling data collection will also be performed as described in Table 1.

These efforts are focused on surface water sampling only. Any sediment or mine waste soil samples will be collected during separate events (and under a separate SAP) so that additional solid contaminants will not be added to the surface water system. Select high flow and low flow sampling events may be determined by the ARSG to be synoptical events using several sampling teams. Field parameters and stream flow measurements will be also collected during the aqueous sample collection.

Samples will be collected during subsequent sampling events at approximately the same time of day to ensure data comparability.

#### **4.1.2 Health and Safety**

All work described herein should be conducted consistent with applicable Occupational Safety and Health Administration (OSHA) requirements. If necessary, personnel involved in the work will be current with respect to the required OSHA training and refresher courses. All field activities will be conducted in strict accordance with an approved ARSG Project Health and Safety Plan, which will be developed before the start of field activities. It is anticipated that all field work can be accomplished in modified Level D personal protective equipment (PPE). Modifications will be based on seasonal access and safety requirements such as avalanche safety equipment. Field personnel will be trained and certified in basic field operations safety, first aid, CPR, avalanche awareness and at a minimum Avalanche Level I. Daily site safety briefing will document field members' training and ability to use any sampling materials and chemicals and safety-related equipment. Volunteers will adhere to the HASP and sign daily health and safety briefing sheets.

The BLM or the Public Lands Office will be responsible for conducting and documenting project-specific training, which will be required for seasonal hazards such as avalanche and during runoff periods. Project-specific health and safety issues associated with sampling will be addressed in the Project Health and Safety Plan (HASP). **The ARSG does not assume responsibility for the safety of volunteers or participating agency representatives, or responsibility for enforcing the provisions of the HASP.**

Water quality sampling events will be led by EPA or BLM with assistance from ARSG members. A minimum of two personnel will conduct sampling in order to maintain the "buddy system," and will have a communications strategy in place with local BLM staff in case of emergency or "fail to show."

In case of emergency: Dial 911 or the San Juan County Sheriff's Department at (970) 387-5531. The San Juan County Search and Rescue Team may be reached via the San Juan County Sheriff's Department.

The nearest hospitals/medical centers to Silverton are:

**Mercy Medical Center Of Durango** - about 55 miles south of Silverton, Durango, at 1010 Three Springs Blvd.  
Durango, CO 81301  
(970) 247-4311

Three Springs Blvd. intersects the north side of Hwy 160 East between the Hwy 160 East / Hwy 550 South intersection (Farmington Hill) and the Hwy 160 / County Road 234 / Highway 172 intersection (Elmore's Corner). Directions are also available by calling (970) 247-4311.

**Montrose Memorial Hospital** - about 60 miles north of Silverton at 800 South Third Street Montrose, CO 81401 (970) 249-2211

#### **4.1.3 Property Access and**

ARSG representatives will obtain property access with the assistance of the EPA Region 8 Site Assessment Manager and BLM staff. Field personnel will have verbal or written consent from all applicable property owners prior to accessing the property for purposes of accessing a sample location. Due to the stakeholder nature of these events, properties owned by the Town of Silverton, BLM, USFS, and San Juan County will have ongoing open access to sampling.

#### **4.2 Sampling Process Design**

This Baseline SAP calls for the Bi-Monthly, or at least quarterly collection of up to 176 water quality characterization samples, including Quality Assurance/Quality Control (QA/QC) samples. Sample locations are shown on Figures 2, 3, and 4 and described in Table 1. The ARSG and volunteers will typically collect 12 samples, including:



- ◆ five MIW source samples (CC19, CC06, CC03D [or if accessible CC03C], CC02D, CC01C),
- ◆ two “bracket” samples upstream and downstream from the American Tunnel discharge point to Cement Creek (CC-OPP-01 and CC18);
- ◆ one sample from Cement Creek North Fork prior to its confluence with Cement Creek (CC07);
- ◆ four field QA/QC samples composed of one duplicate, one field blank, one rinsate blank (if equipment decontamination is required), one filter blank; and,
- ◆ one laboratory QA/QC Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample collected at a rate of one per twenty samples per matrix. The extra volume MS/MSD samples will not be labeled as separate samples.

Samples are regularly collected from four existing gauges by other groups. The ARSG have access to these data; however, if needed, samples will be collected from existing gauging stations. These will consist of:

- ◆ one sample from the TMDL compliance point (A72);
- ◆ one sample from the Mineral Creek (M34);
- ◆ one sample from the Animas River at the 14<sup>th</sup> Street Gauge (A68);
- ◆ one sample from Cement Creek upstream of the Animas River Confluence (CC48);

Aqueous samples will be submitted for 23 total and dissolved TAL metals; however the contaminants of concern are aluminum, cadmium, copper, iron, lead, manganese, and zinc. Other analyses will consist of anions (fluoride, chloride, nitrate/nitrite-N low level, sulfate, acidity (as  $\text{CaCO}_3$ ), hardness (calculated from calcium and magnesium concentrations in the dissolved ratio), total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and total dissolved solids (TDS). Tables 1, 3, and 4 provide the analytical methods' details.

Laboratory method detection limits will be below selected standards and applicable benchmarks (Tables 3 and 4). All samples will be analyzed either through the EPA Region 8 Laboratory or an EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS) laboratory.

#### **4.2.1 Surface Water Sampling Procedures**

Wherever possible, water quality samples and flow measurements will be taken at locations such that significant in-flow metal contributions can be bracketed. Water quality samples and stream flow data will be used to characterize the concentrations, loads, and seasonal distribution of metal concentrations throughout the stream segment.

Sampling will progress from downstream to upstream locations to eliminate sediment disturbance in subsequent samples and minimize the potential for cross contamination. Surface water samples will be collected by immersing the sample bottle several inches beneath the water surface with the mouth of the sample bottle facing upstream. A separate surface sample may be collected if immiscible fluids are observed. To collect such a sample, the sample container will be inverted, lowered to the approximate sample depth and held at about a 45-degree angle with the mouth of the bottle facing downstream.

If surface water samples cannot be collected directly into the sample container, a decontaminated 1-liter bottle will be used to collect the sample. The bottle will be rinsed three times in the water to be sampled prior to collecting the sample. Care will be taken to avoid excessive agitation when transferring samples to the sample containers. Integrated width sampling will be performed whenever possible, especially in areas where the mixing of upstream inflows is potentially incomplete.

Water discharging from springs and seeps will be sampled opportunistically if they are thought to be important sources of MIW to upper Cement Creek. Samples will either be withdrawn directly from the discharge source, as in surface water sampling procedures, or will be directed into a shallow, hand dug, holding pond. In this case, care will be taken to allow sediments to settle and several volumes of water to be replaced in the developed pool before sampling.

Measures will be taken to minimize the amount of in-field equipment decontamination required for the sampling event. Reused sampling equipment will be decontaminated prior to the sample event. Decontamination will be achieved by washing with an acid rinse and triple rinsing with de-ionized water. Field equipment will be decontaminated by triple rinsing in the field.

##### **4.2.1.1 Dissolved Fraction**

Water samples for dissolved metals analysis will be field filtered with a 0.45 micron filter into the sample container and then preserved at a pH of 2 with nitric acid. Water samples for total metals analysis will not be filtered, but will be preserved at a pH of 2 with nitric acid. A non-filtered, non-acidified (raw) sample will be collected for anions. Holding times for acidified samples will not exceed 6 months, whereas raw water samples are to be held no longer than 28 days before analysis.

Filtration will be done in accordance with the "EPA Minimum Field Requirements" document (EPA 1996), which follows standard operating procedures for the filtration of water samples; or with the following modification:

Disposable encapsulated .45 micron filters (Gelman Sciences ion chromatography

arcodisc or similarly approved disposable filter) may be used in place of the filter in the Swinnex filter holder. In this case, filters are rinsed with approximately 10 ml of the water to be sampled before the sample is collected. If the filter clogs, a new disposable encapsulated filter will be used. The new filter will also be rinsed with approximately 10 ml of the water to be sampled before continuing with the sample collection.

#### **4.2.1.2 Field Parameters**

In-situ field measurements of aqueous samples will be taken at the same approximate time as the aqueous samples are collected and will include: temperature, pH, specific conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO) (Tables 1 and 2). These measurements will be taken using EPA field SOPs and protocols that ARSG has adopted and will be documented on field data sheets. Manufacturer's instructions for calibration and measurement of all field multi-meters will be followed. The types of meters used and calibration frequency (i.e., daily) will be noted on the field sheet.

Flow measurements or estimates will also be made and sampling locations' latitude and longitude will be recorded. Other notable observations will be documented on field data sheets. Photographs will be listed by date, time, location, and direction (facing) in a logbook or field data sheet.

#### **4.3 Surface Water Flow Measurements**

Surface water samples will be collected prior to capturing flow measurements. The measurements will be in accordance with the "Standard operating procedures for the collection of flow" (Attachment 4). Depending on conditions and equipment availability, flow will be collected with a flume, culvert (using standard culvert flow conversion tables), a 5-gallon bucket, or the Marsh McBirney flow sensor.

Flow data will be documented on the attached Surface Water Sampling and Stream Discharge Form (Attachment 1). Flow data will be used in the calculation of metals loading and flow will be measured at a suitable location within the sample reach that is as close as possible to the location where the surface water sample was collected. More than one flow measurement should be collected as a QA/QC check where the creek bottoms are rocky and non-laminar flow is probable.

#### **4.5 Control of Contaminated Materials**

Investigation-derived waste (IDW) generated during the sampling activities will be non-hazardous and will be handled in accordance with the EPA Office of Emergency and Remedial Response (OERR) Directive 9345.3-02, "Management of Investigation Derived Waste During Site Inspections," May 1991 (EPA 1991). Used preservative ampules will be neutralized and contained. Other disposable sampling equipment, rubber gloves, and protective outerwear will

be decontaminated, bagged, removed from the site and disposed of as a non-hazardous solid waste. This material will be bagged and disposed of at the Silverton transfer station.

#### **4.6 Analytical Parameters**

Tables 1 through 4 list the sampling locations, field methods, and analytical parameters. Analytical laboratory parameters for routine and opportunity aqueous samples will include: Total and dissolved Target Analyte List (TAL) metals, anions (fluoride, chloride, nitrate/nitrite-N low level, sulfate, acidity (as  $\text{CaCO}_3$ ), hardness (calculated from calcium and magnesium concentrations in the dissolved ratio), total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and total dissolved solids (TDS). Laboratory reporting limits will be below selected standards and applicable water quality standards (Tables 4 and 5). Metals results for aqueous samples will be compared to existing ambient standards for Cement Creek and water quality standards set for the Animas River TMDL compliance point at A72.

#### **4.7 Analytical Methods Requirements**

Analytical methods to be followed in this study are listed below. The methods used are described in the EPA Region 8 laboratory standard operating procedures. Any problems with the analytical methods that may be encountered during the study will be reported to ARSG and addressed by the laboratory technical manager. All samples will be analyzed either through the EPA Region 8 Laboratory or an EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS) laboratory. The EPA regional lab or CLP lab will be responsible for following decontamination methods and waste disposal requirements.

### **5.0 FIELD QUALITY CONTROL PROCEDURES**

Measurement errors are reduced by following available technical SOPs for conducting field operations at hazardous waste sites and by following strict laboratory protocols. Such TSOPs reduce measurement errors by standardizing procedures such as sample collection methods and instrument calibration, maintenance, and use.

Sample collection will progress from downstream to upstream to prevent cross contamination and aqueous samples will be collected prior to opportunity sediment or waste samples. All samples will be handled and preserved as described in the EPA Region 8 Minimum Requirements for Field Sampling Activities (EPA 1996). Calibration of the pH, temperature, and conductivity meters will follow instrument manufacturers' instruction manuals and the EPA Region 8 Minimum Requirements for Field Sampling Activities (EPA 1996).

#### **5.1 Inspection/Acceptance requirements for Supplies**

For these events, the ARSG anticipates that pre-cleaned, and pre-preserved sample bottles sample bottles will be provided by the EPA Region 8 Laboratory, and will be part of the quality control program. The sample containers to be used for this project will be: 250 milliliter to 1 liter polyethylene bottles for surface water and other aqueous source samples (Table 3).

Filters for 0.45 micron filtration are ion chromatography arcodiscs obtained from Gelman sciences. Bottles and filters will be inspected before use, and any that have been damaged during shipment will be discarded to a location where they will not be inadvertently reused.

## **5.2 Instrument Calibration and Frequency**

Field pH and conductivity meters will be calibrated at the beginning of each sampling day according to the manufacturer's specifications and will be noted on the Surface Water Sampling and Stream Discharge Form. Meters will be checked periodically during the day, with particular attention being given to re-calibration when temperatures change significantly, and when the character of the water changes significantly (e.g., draining adit vs. stream water.)

## **5.3 Field QA/QC Samples**

The following types of samples will be provided for QA/QC purposes:

- Field blanks will be prepared for each group of sampling at the rate of one per 20 samples of a similar matrix per each day of sampling.
- One duplicate water matrix water sample will be collected per 20 samples shipped to determine accuracy and precision in laboratory, analytical procedures and sample collection procedures.
- One de-ionized water blank will be taken from the source of DI water, which will be used for all equipment decontamination rinses.
- If equipment decontamination is required, one rinsate blank sample will also be collected.

QA/QC samples will be submitted with separate sample ID's as blind samples.

One triple volume sample per 20 water samples can be collected, to provide matrix spike and matrix spike duplicate (MS/MSD) to allow for a check of laboratory quality control procedures.

## **6.0 SAMPLE HANDLING AND CHAIN OF CUSTODY**

Sample containers will be labeled with permanent marker or wax pencil directly on plastic bottles and on label tape on glass containers. The label shall contain the following sample identification information:

Waterbody - name and station number.

Date

Sampler's initials

Remarks - special processing such as filtration, split sample, etc.

Time of day.

Sample preservation – (HCl, HNO<sub>3</sub>)

Sample Type: Filtered or unfiltered metals, chlorofluorocarbons, anions, sulfur isotopes.

Filtered and unfiltered samples from a single site, along with a copy of the field data form, will be kept together in a plastic zip lock bag. Immediately after collection, samples will be kept in a cooler with ice at all times until they are transferred to the laboratory refrigerator, or sent to be analyzed. Samples must not be allowed to freeze. The necessary sample field documentation will be filled out on site (date, time, sampler, site, sample number and type) on the Animas River Surface Water Sampling and Stream Discharge Form (Attachment 1).

Sample custody consists of two components: documentation and actual physical custody of the official sample. Physical custody consists of two phases: custody in the field and custody in the laboratory. Sample custody is less stringent for characterization and "Best Management Practices" monitoring than it would be for samples collected for enforcement or standards setting.

The following principles apply to all handling of samples from the point of collection through the placing of a sample in a secured location at the laboratory. The sample is considered in "custody" if:

1. It is in one's actual physical possession or view.
2. It is in one's physical possession so as not to be tampered with, i.e. under lock and restricted key or under official seal.
3. It is retained in a secured area with restricted access.
4. It is placed in a container and secured with an official seal(s) evidence tape such that the sample cannot be reached without breaking the seal(s).

Field personnel will use chain-of-custody (COC) forms supplied by the EPA Region 8 lab, which contains the same elements as the COCs outlined in the EPA Region 8 Minimum Requirements for Field Sampling Activities (EPA 1996). COCs will accompany the cooler from the sampling site to the lab.

## **7.0 DATA REDUCTION, VALIDATION AND REPORTING REQUIREMENTS**

Records will be kept of actual sample locations and sample points will be accurately located on appropriate topographic maps. Procedures will provide documentation of changes in sample locations as they occur in the field due to unanticipated conditions. Sample locations and sample collection procedures will be documented through the keeping of a project-specific field notebook, field data sheets, and photolog. Field data sheets will be kept by ARSG.

The results of laboratory analyses, including raw data sheets, QA/QC reports, and a summary of the data, will be forwarded to Bill Schroeder, EPA Region 8 Lab, Office of Technical and Management Services (TMS). The laboratory will provide the data to Mr. Schroeder in electronic format (Excel spreadsheet) for his preliminary review. If any lab QA/QC does not meet EPA acceptance criteria, Mr. Schroeder will be notified. He will in turn contact Bill Simon, ARSG QA Manager for instruction on how to proceed. Lab analysis results will be transcribed into the master database (an Excel database) maintained by the Animas River Stakeholders Group, Bill Simon, Watershed Coordinator; and

eventually into EPA's STORET database at the discretion and task of the EPA. Data validation for chemical analyses will follow EPA procedures.

The water chemistry and flow data will be evaluated by ARSG members. Analytical results will be compared to prior data at the same locations, and also to streams in the vicinity. Outliers or nonsensical data should be obvious, given the wealth of characterization data in the Upper Animas basin. If errors are detected, transcription errors from field or lab sheets will be checked, and quality control analyses will be reviewed. Data entry errors will be corrected. Inconsistencies will be flagged for further review, or discarded. Any problems with data quality will be discussed by the Monitoring Working Group and recommendations made to Bill Simon, Watershed Coordinator and QA Manager.

Interim reports of progress and results of upper Cement Creek and TMDL compliance point characterization will be given at Animas River Stakeholders Group monthly meetings. Any concerns about accepting, rejecting or qualifying the data will be made by the Monitoring Working Group and Bill Simon, who is in charge of data management.

Ultimately, all data will be entered into the ARSG database and EPA STORET database. The ARSG Coordinator will share a verbal report. Data interpretation will occur through discussions among ARSG participants and will be documented in a narrative Project Summary Report by the ARSG Monitoring Work Group. The content and format will follow previous ARSG reports and will tabular and graphical data presentation, data evaluation, and conclusions. Supporting data, documentation, and field forms will be attached as appendices as appropriate.

### **7.1 Assessment and Response Actions**

Interim reports of progress and results of this characterization study will be given at Animas River Stakeholders Group monthly meetings. Any concerns about data collection procedures will be resolved by the Group at that time.

All field and laboratory activities may be reviewed by state and EPA quality assurance officers as requested.

### **7.2 Reconciliation with Data Quality Objectives**

The EPA will provide preliminary and validated analytical results to the ARSG, so that they may revisit the DQOs and perform a Data Quality Assessment as soon as they become available.

The objectives of this characterization study are to collect monthly water samples and flow measurements; and to assess changes in water quality and metals loads over time. Depending on the complexity of the geochemical situation encountered, it may take several years of data collection to adequately characterize the metal sources. Other tributaries of the Animas River and stream segments have undergone similar characterization of its contamination sources. One always wants more data, but those existing data sets on the other tributaries and segments have been adequate for source analysis and recommendation of standards and remedial actions. The procedures described here will hopefully be adequate to generate similar recommendations for modifying stream standards, TMDLs, and remediation of contaminating sources.

All data will be entered into the ARSG database and interpreted through discussions among ARSG participants. Data will be used to monitor water quality changes over time and to make decisions as outlined in the DQO steps.

## **8.0 DATA QUALITY ASSESSMENT**

The data quality assessment will help determine data quality and usability. The DQA will be completed by EPA regional lab staff and will include:

- A QA/QC review of field generated data and observations;
- Individual data validation reports for all sample delivery groups;
- Review of the procedures used by the validator to qualify data for reasons related to dilution, reanalysis, and duplicate analysis of samples;
- Evaluation of QC duplicate sample and matrix spike laboratory control samples to assess the quality of the field activities and laboratory procedures;
- Assessment of the quality of data measured and generated in terms of accuracy, precision, and completeness; and
- Summary of the usability of the data, based upon the assessment of data conducted during the previous steps.

Following completion of the DQA process, the ARSG will compile the data into a report. Data acceptance criteria for accuracy, precision, and completeness are expressed as quantitative and qualitative statements and are detailed below.

### **8.1 Precision**

Precision is a measure of mutual agreement among duplicate or collocated sample measurements of the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte will be expressed as the relative percent difference for results of field replicate samples, matrix spike duplicate samples for organic analyses, and duplicate samples for inorganic analyses. In addition, precision will be maintained by conducting routine instrument checks to demonstrate that operating characteristics are within predetermined limits. Precision goals are included in the table below. The precision goal for metals analysis of water is a relative percent difference (RPD) of  $\pm 20\%$ .

### **8.2 Accuracy**

Accuracy is a measure of bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. Accuracy will be expressed as the percent recovery of the analyte from a surrogate or matrix spike sample and occasionally from the analysis of a standard reference sample compared to actual analyte concentration. The accuracy goal for metals analysis of water is 75% to 125% recovery.



### **8.3 Representativeness**

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design of and rationale for the sampling program (in terms of the purpose for sampling, selection of sampling locations, the number of samples to be collected, the ambient conditions for sample collection, the frequencies and timing for sampling, and the sampling techniques) ensure that environmental conditions have been sufficiently represented.

Variations in data can be attributed to weather conditions including rain and snow fall, time of year, passage of time, and other factors. Previous data will be reviewed for trends and differences in conditions and flow rates for purposes of calculating future treatment plant capacity required for the various options and reducing the possibility of a decision error. Reviewing the variations in previous data will allow for more accurate projections of the range of flow and metals loading and the capacity required to adequately treat the water.

### **8.4 Comparability**

The comparability goal will be achieved through the use of TSOPs to collect and analyze representative samples, and by reporting analytical results in appropriate and consistent units. Each analytical procedure selected from among the acceptable options will be used throughout the initial and subsequent sampling events unless a rationale is provided for an alteration. In essence, comparability will be maintained by consistency in sampling conditions; e.g., samples will be collected during subsequent sampling events at approximately the same time of day to ensure data comparability; selection of sampling procedures, sample preservation methods, analytical methods, and data reporting units. Deviations that will impact comparability will be discussed among ARSG members and documented in a "Deviations from the SAP" section of the analytical results report.

The extent to which this data will be comparable with data collected previously and in the possession of the Animas River Stakeholders Group is not known. The rounds of analytical data will be compiled and a Data Quality Assessment will be conducted by the ARSG QA Manager and technical workgroup.

### **8.5 Completeness**

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected according to the FSP (i.e., measurements that were planned to be collected) (EPA 2001b). The actual percentage of completeness is less important than the effect of completeness on the data set.

There are many reasons samples may be un-collectable: weather, access, and site conditions. For example, a water body that existed when the FSP was designed might not contain water when the

sample is scheduled for collection. Denial of access to collect a sample would also affect completeness. The completeness goal for these sampling events is 100%.

## **8.6 Sensitivity**

Sensitivity is the ability of the method or instrument to detect the target analytes at the level of interest. The fixed laboratory will evaluate sensitivity by preparing and analyzing a laboratory fortified blank; a blank matrix spiked at the quantitation limit (QL) or reporting limit (RL) with target analytes. Sensitivity will be measured by calculating the percent recovery of the target analytes at the RL.

## 9.0 LIST OF REFERENCES

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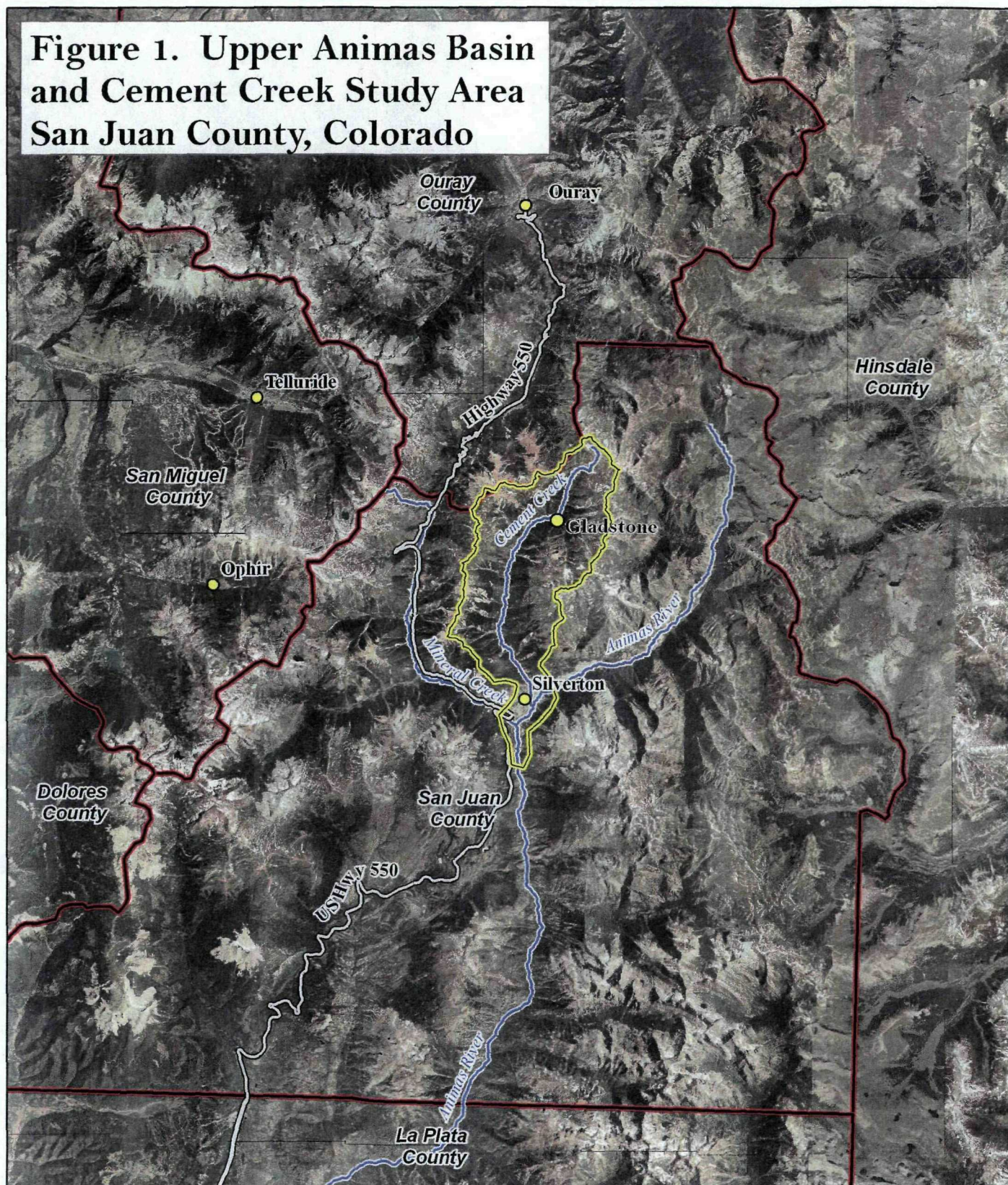
U.S. Environmental Protection Agency (EPA). 2001a. "EPA Requirements for Quality Assurance Project Plans" EPA QA/R-5. March 2001.

U.S. Environmental Protection Agency (EPA). 2001b. EPA QA/G-5i 2001. Guidance on Data Quality





**Figure 1. Upper Animas Basin  
and Cement Creek Study Area  
San Juan County, Colorado**



- Cities and Towns
- Study Area
- Highway 550
- Rivers and Streams
- County Boundaries

0 2 4 Miles

Date: March 16th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (3/2009)

Streets: GDT 2006

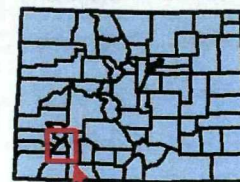
Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



TechLaw

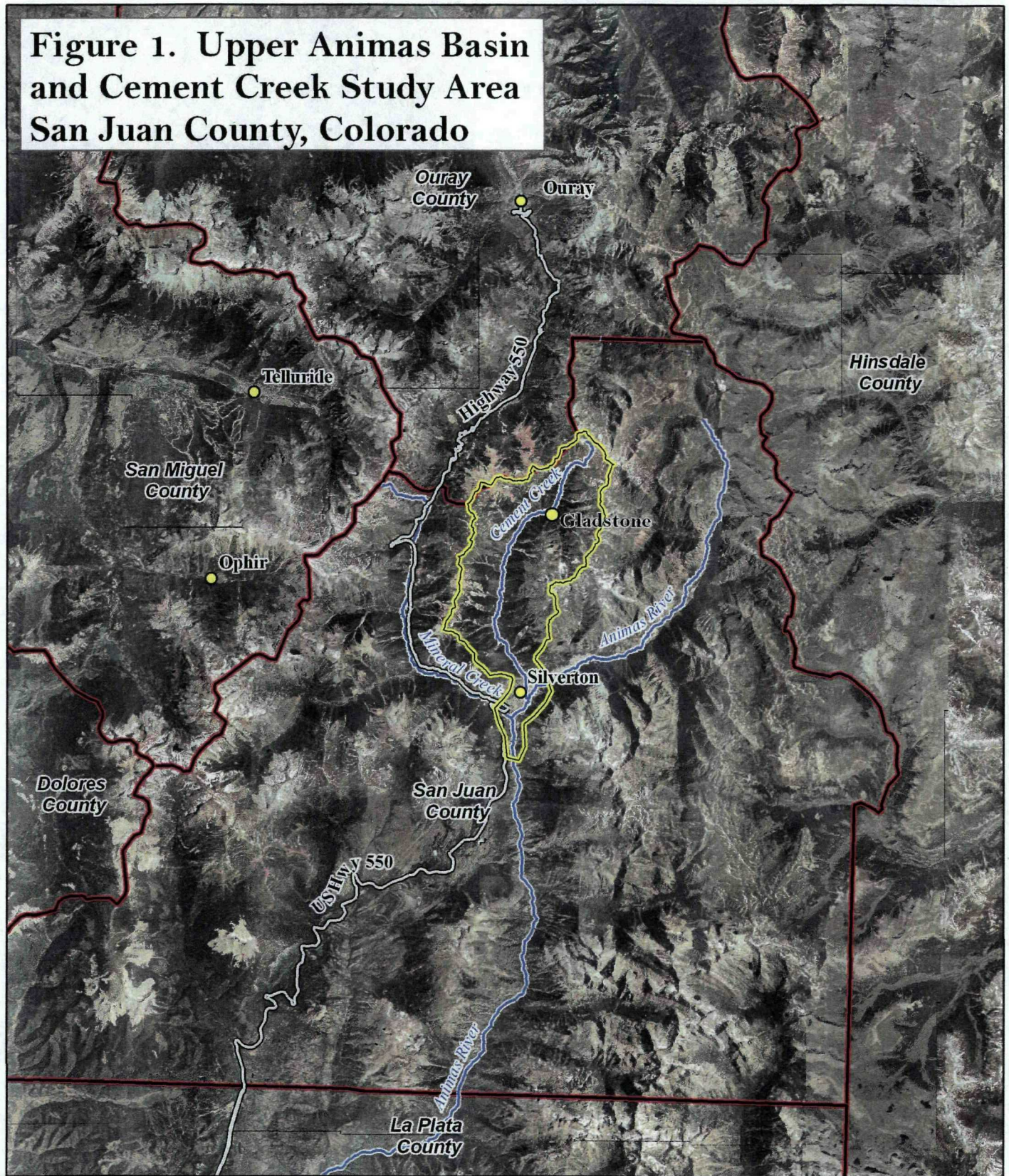
**Colorado**



Area of Interest



**Figure 1. Upper Animas Basin  
and Cement Creek Study Area  
San Juan County, Colorado**



- Cities and Towns
- Study Area
- Highway 550
- Rivers and Streams
- County Boundaries

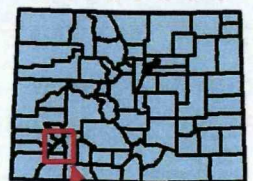
0 2 4 Miles

**Date:** March 16th, 2009  
**Coordinate System/Projection:**  
 UTM Zone 13 North, NAD 83, Meters  
**Sources:**  
 Sample Locations - USEPA Region 8 and UOS (3/2009)  
 Streets: GDT 2006  
 Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)  
 County Boundaries: U.S. Census Bureau (2000)



TechLaw

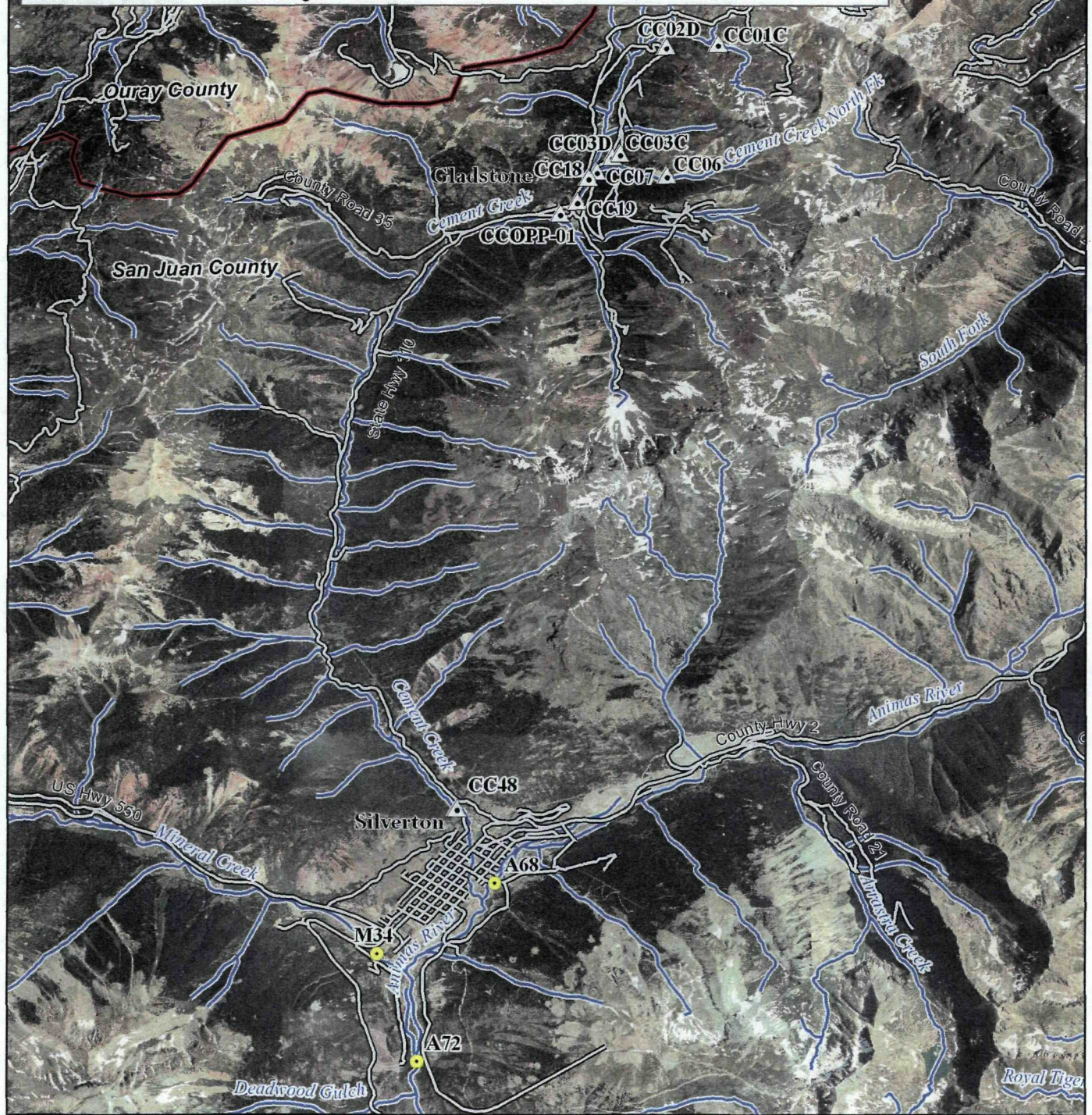
**Colorado**



**Area of Interest**



**Figure 2. Overview of Sample Locations  
Animas River, Mineral Creek, and Cement Creek  
San Juan County, Colorado**



- Animas River & Mineral Creek Sample Locations
- ▲ Cement Creek Sample Locations
- Streets
- Rivers and Streams
- County Boundaries

0 1 2 Miles

Date: March 9th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (3/2009)

Streets: GDT (2006)

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau, (2000)



TechLaw

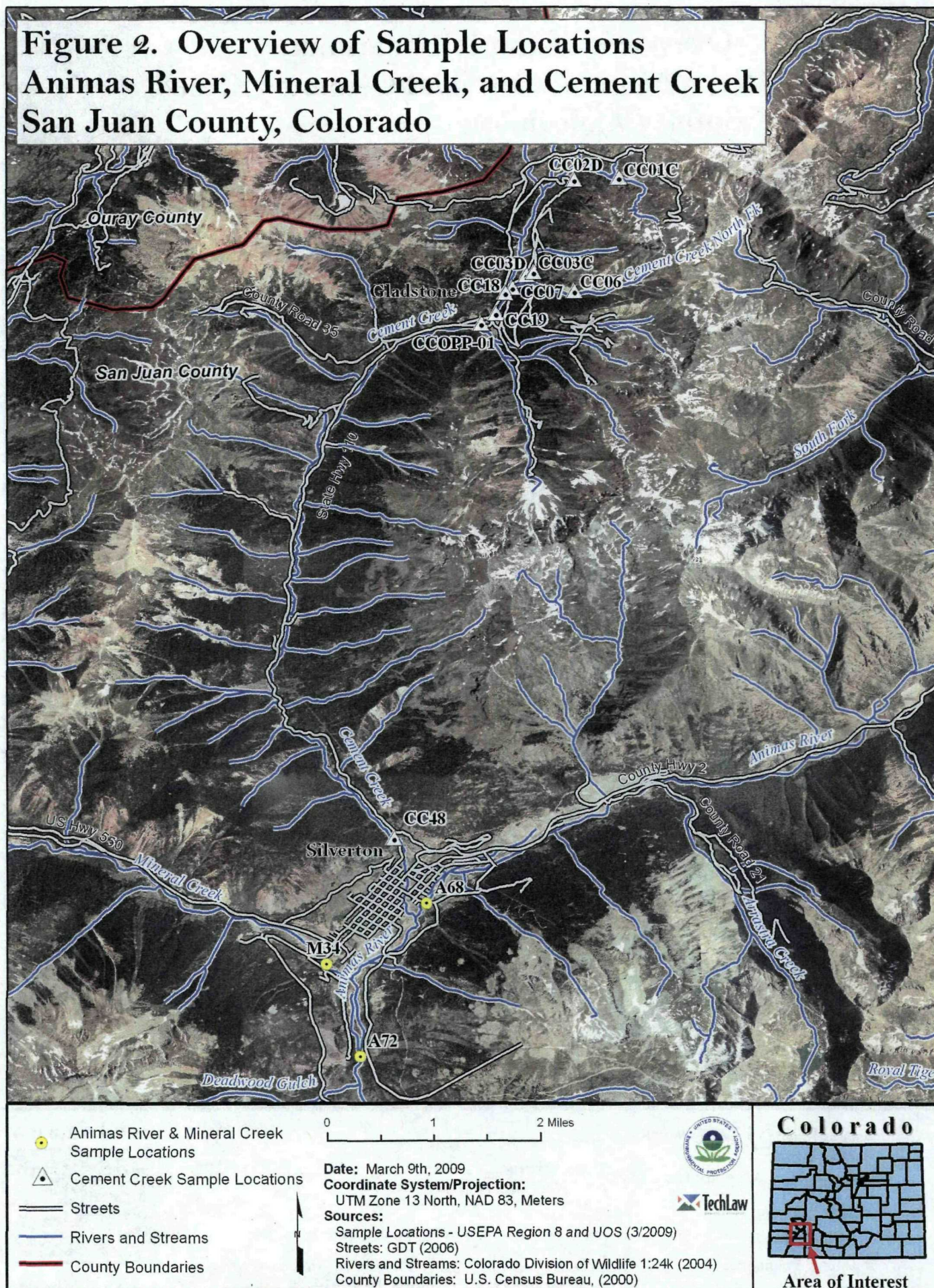
Colorado



Area of Interest



**Figure 2. Overview of Sample Locations  
Animas River, Mineral Creek, and Cement Creek  
San Juan County, Colorado**





**Figure 3. Upper Animas Sample Locations  
San Juan County, Colorado**



Animas River  
and Mineral Creek  
Sample Locations



Cement Creek  
Sample Locations



Streets



Rivers and Streams

0 0.25 0.5 Miles

Date: March 9th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (3/2009)

Streets: GDT (2006)

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau, (2000)



Colorado



Area of Interest



**Figure 3. Upper Animas Sample Locations  
San Juan County, Colorado**



Animas River  
and Mineral Creek  
Sample Locations



Cement Creek  
Sample Locations



Streets



Rivers and Streams

0 0.25 0.5 Miles

**Date:** March 9th, 2009

**Coordinate System/Projection:**

UTM Zone 13 North, NAD 83, Meters

**Sources:**

Sample Locations - USEPA Region 8 and UOS (3/2009)

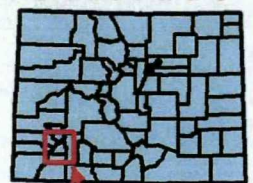
Streets: GDT (2006)

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau, (2000)



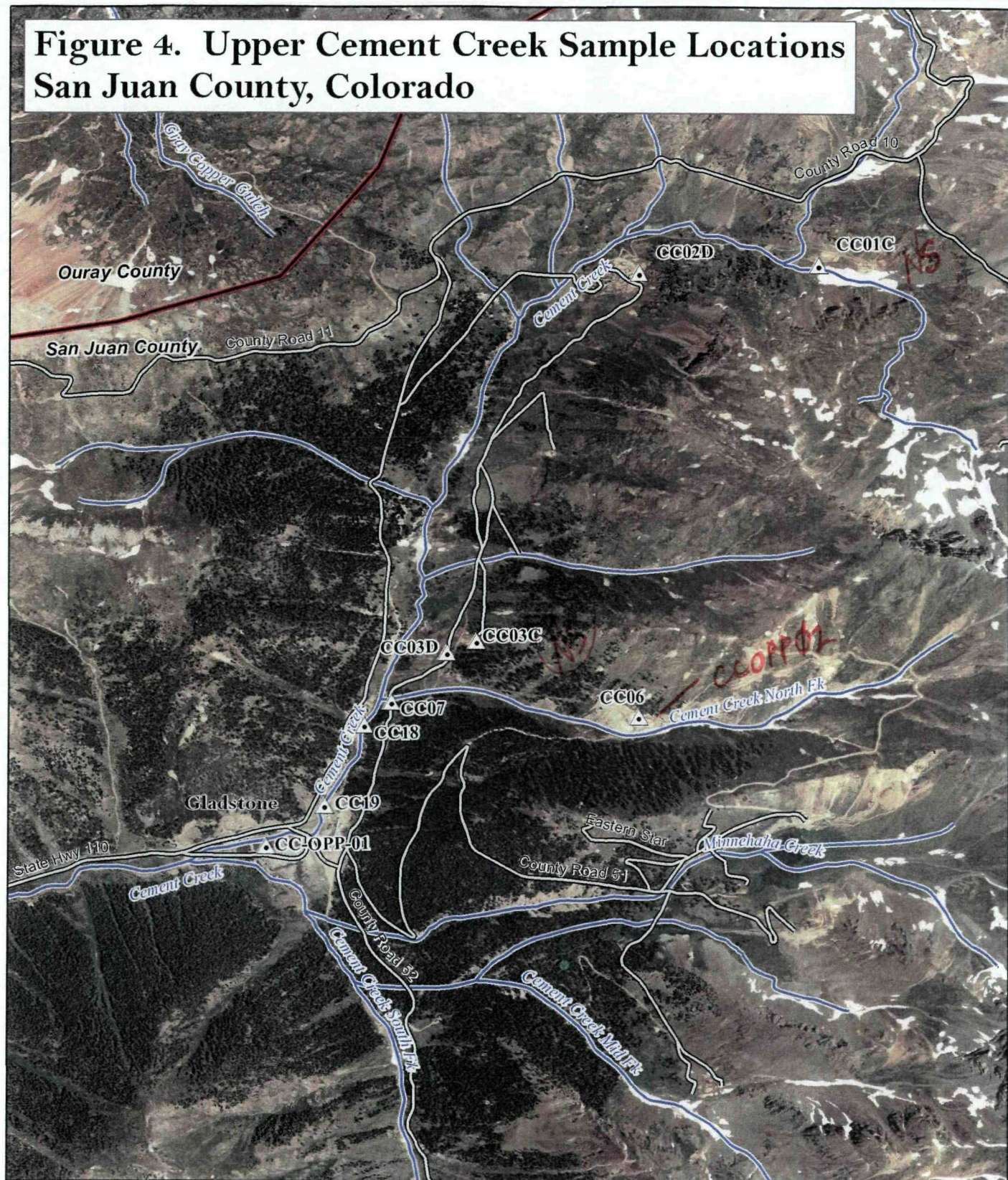
**Colorado**



**Area of Interest**



**Figure 4. Upper Cement Creek Sample Locations  
San Juan County, Colorado**



Cement Creek  
Sample Locations



Streets



Rivers and Streams



County Boundaries

0 0.25 0.5 Miles

Date: March 9th, 2009

Coordinate System/Projection:

UTM Zone 13 North, NAD 83, Meters

Sources:

Sample Locations - USEPA Region 8 and UOS (3/2009)

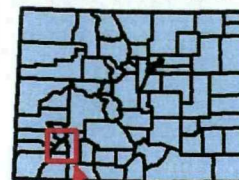
Streets: GDT 2006

Rivers and Streams: Colorado Division of Wildlife 1:24k (2004)

County Boundaries: U.S. Census Bureau (2000)



Colorado



Area of Interest



<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride	TAL Total & Dissolved Metals, Sulfate, Alk, TOC, DOC, TSS, TDS, Chloride
<b>Animas River and Mineral Creek Sampling Locations (Downstream to Upstream)</b>										
A72		37.7919	107.6833		Animas Gauge below Silverton	Yes	Yes	Yes	Yes	
M34	09359010; 104	37.8028	107.6722		Mineral Creek Gauge	Yes	Yes	Yes	Yes	
A68		37.8111	107.6586		14 <sup>th</sup> Street Gauge @ 13 <sup>th</sup> Street Bridge	Yes	Yes	Yes	Yes	
<b>Cement Creek Sampling Locations (Downstream to Upstream)</b>										
CC48	323, 09358550	37.8200	107.6631	9,400.00	Cement Creek gauging station	Yes	Yes	Yes	Yes	
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CCOPP-01	none	Unknown	Unknown		CC downstream of AT discharge – well mixed	Yes	Yes	Yes		Yes
CC19	GTSW02 (UOS designation)	Unknown	Unknown		<u>American Tunnel</u> @ flume (prior to reclamation, was collected just inside tunnel)	Yes	Yes	Yes	Yes	

**Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]**

Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sup>3</sup> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sup>3</sup> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC18		37.8917	107.6483		Cement Creek above AT discharge to CC	Yes	Yes – needs verified	Yes	Yes	
CC07	UOS-GTSW11; CC-12	37.8951; 37.8939	107.6468; - 107.6375		N Fork above CC confl. immedi. upstr. of Cty Road	Yes	Yes – needs verified	Yes	Yes	
CC06	Is there a C GFI alias? GTSW08 (UOS designation)	37.8946	107.6384		<u>Gold King 7<sup>th</sup> level</u> – east adit flume or immediately inside adit opening	Yes	Yes – needs verified	Yes	Yes	
CC03D	Prior R&B samples not collected from same location GTSW07 (UOS designation)	37.8968	107.6449		<u>Red &amp; Bonita</u> – Culvert drainage channel along waste rock @ toe of slope	Yes	Yes – needs verified	Yes	Yes	
CC03C		37.8972	107.6439		<u>Red &amp; Bonita</u> – Portal discharge	Yes	Yes – needs verified	Yes	Yes	

<b>Table 1: Upper Animas Basin and Cement Creek Sampling Locations and Sample Collection Summary) [continued]</b>										
Sample Location ID	Location Alias(es)	Latitude (North)	Longitude (West)	Elevation	Location Description	Field Parameters			Routine Water Quality Analyses	Opportunity Water Quality Analyses
						Photograph	GPS (collect or verify for all)	Temp, pH, Spec Cond, DO, ORP, Flow	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sup>3</sup> ), TOC, DOC, TSS, TDS	Anions (F, Cl, Sulf), TAL Total & Diss Metals, Acidity (as CaCO <sup>3</sup> ), TOC, DOC, TSS, TDS
<b>Cement Creek Sampling Locations (Downstream to Upstream) [continued]</b>										
CC02D	ARSG-CC02D; SO-5; UOS - GTSW09	37.5435 (UOS 37.9098)	107.3819 (UOS 107.6384)	11358.00	<u>Mogul</u> – @ flume	Yes	Yes	Yes	Yes	
CC01C	UOS-GTSW10	37.9101	107.6322		<u>Grand Mogul</u> – collected 100 ft fr waste rock @ toe	Yes	Yes -needs verified	Yes	Yes	
CC-OPP-02					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	
CC-OPP-03					OPP= Opportunity	If applicable	If applicable	If applicable	If applicable	
CC-FR -01					FR= Field Rinsate QA/QC	NA	NA	NA	Yes	
CC-FILT-01					Filter Blank QA/QC				Yes– for dissolved fraction	
CC-FB -01					FB= Field Blank QA/QC	NA	NA	NA	Yes	NA
Use Sample Location ID					Field Duplicate	NA	NA	Yes	Yes	NA
<b>Total Samples</b>								<b>14</b>	<b>16</b>	<b>1</b>



**Table 2: Field Parameters to collect at surface water sample locations**

Parameter, units	Method	Reporting Limit *	Adjacent Measurement Accuracy Goals	Holding Time	EPA Method Number	Container type
Temperature, °C	Hydrolab or YSI Multimeter Probe	0.1 °C	0.5 °C	Field analysis	EPA 170.1	In situ or field container
Specific Conductance, $\mu$ Siemens/cm	Hydrolab or YSI Multimeter Probe	1 $\mu$ S/cm	15%	Field analysis	EPA 120.1	In situ or field container
pH, standard units (s.u.)	Hydrolab or YSI Multimeter Probe	0.01 s.u.	0.5 s.u.	Field analysis	EPA 150.1	In situ or field container
Dissolved oxygen	Hydrolab or YSI Multimeter Probe	0.0 mg/l	+/- 0.7 mg/l	Field analysis	EPA 360.1	In situ or field container
Oxygen/Reduction Potential (ORP), milliVolts (mV)	Hydrolab or YSI Multimeter Probe	+/-	+/- 10 mV	Field analysis	ASTM D1498-76	In situ or field container
Flow, cubic feet/second (cfs)	Marsh McBirney or StreamPro ADCP" Doppler	0.7 cfs	10% rule	Field analysis	EPA R8 SOP 722	NA

**EPA Region 8 Laboratory Standard Operating Procedure (SOP) 720 and SOP 722  
 Field Sampling Protocols and Field Flow Measurements**

Table 3 Aqueous Sample Fixed Lab Analytical Summary								
EPA R8 Analyte Group	Analyte	Reporting Limit (RL)	Units	Analytical Method	R8 SOP	Hold Time	Preservative	Container
Anions	Fluoride (F)	0.2	mg/L	EPA 300.0	SOP 310	28 days	Chill < 4 C	250 mL LDPE
	Chloride (Cl)	0.5						
	Sulfate (SO4)	1						
Wet Chemistry	Acidity (as CaCO <sub>3</sub> )	5	mg/L	EPA 305.1	SOP 302	14 days	Chill < 4 C	250 mL LDPE
	Total & Diss Org Carbon (TOC & DOC)	0.5	mg/L	EPA 415.1	SOP 322	28 days	Chill < 4 C, H3PO4, pH < 2 (can use HCl or H2SO4 also)	
Solids	Total Dissolved Solids (TDS)	4	mg/L	EPA 160.1	SOP 304	7 days	Chill < 4 C	1.0 L LDPE
	Total Suspended Solids (TSS)	4	mg/L	EPA 160.2	SOP 303			
Metals	Total Recoverable Metals (TRM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	HNO3, pH < 2	250 mL LDPE
	Dissolved Metals (DM)	see Table 4 for individual analytes	ug/L	EPA 200.7 and 200.8	SOP 201-ICP-MS and 210-optima	180 days	Field filtered with 0.45µm HNO3, pH < 2	250 mL LDPE

Note: Acidity (as CaCO<sub>3</sub>), Total Dissolved Solids (TDS), Total Suspended Solids (TSS) will be analyzed by a commercial lab – collect 1 liter unfiltered for these analyses.

**Table 4: EPA Region 8 Inorganic (Metals) Reporting Limits for Water Samples**

	ICP-OE EPA Method 200.7	ICP-MS EPA Method 200.8	Historic ARSG RLs
Element	ug/L	ug/L	ug/L
Aluminum	100	NA	20
Antimony	NA	1	2
Arsenic	NA	4	1
Barium	4	0.3	0.5
Beryllium	1	NA	0.2
Boron	100	NA	NA
Cadmium	1	0.2	0.2
Calcium	100**	NA	100**
Chromium	2	NA	5
Cobalt	2	NA	2
Copper	10	3	0.8
Iron	100	NA	5
Lead	10	1	0.5
Magnesium	50**	NA	50**
Manganese	2	NA	0.5
Molybdenum	4	NA	0.5
Nickel	2	1	0.3
Potassium	1000**	NA	1000**
Selenium	NA	1	1
Silica	400	NA	200
Silver	8	0.5	0.3
Sodium	500**	NA	500**
Strontium	2	NA	3
Thallium	NA	0.3	20
Titanium	5	NA	5
Vanadium	10	NA	10
Zinc	40	5	4
Hardness (mg/l)**	Calculated from dissolved Ca and Mg		0.2 mg/l
NA = Not applicable			
*Reporting limits for metals vary depending due to variations in sample matrix and individual laboratory abilities. The reporting limits listed above will be used as guidelines and attempts will be made to have these limits met as nearly as feasible.			
** From dissolved fraction			

**Table 5: Reporting Limits Compared to Applicable Water Quality Standards for Animas River Segment 7 and 4a -(Metal concentrations for Dissolved Metals Unless Otherwise Noted by TRec)**

	Region 8 Reporting Limits	Stream Segment 7 (Acute)*	Stream Segment 7 (Chronic)	Stream Segment 4a (Acute)	Stream Segment 4a (Chronic)
Element	ug/L	ug/L	ug/L	ug/L	ug/L
Aluminum	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (700-3550)	Monthly Standards [2523 (TRec)]
Arsenic	4	--	100 (TRec)	340	--100 (TRec)
Beryllium	1	--	100 (TRec)	--	--
Cadmium	0.2	To Maintain and Achieve WQS at Segments 4a and 4b	10 (TRec)	TVS 3.1 (trout)	TVS [2.5]
Calcium	100**	--	--	--	--
Chromium III	2	--	100 (TRec)	TVS 1005	TVS 130
Chromium VI	2	--	100 (TRec)	TVS 16	TVS 11
Copper	3	To Maintain and Achieve WQS at Segments 4a and 4b	200 (TRec)	TVS 25.9	TVS [20]
Iron	100	To Maintain and Achieve WQS at Segments 4a and 4b	--	Monthly Standards (1220 – 3776)	Monthly Standards [4204 (TRec)]
Lead	1	To Maintain and Achieve WQS at Segments 4a and 4b	100 (TRec)	TVS 140	TVS 5
Magnesium	50**	--	--	--	--
Manganese	2	To Maintain and Achieve WQS at Segments 4a and 4b	--	TVS 3700	TVS 2100
Nickel	1	--	200 (TRec)	TVS 842	TVS 93
Selenium	1	--	20 (TRec)	TVS 18.4	TVS 46
Silver	0.5	--	--	TVS 6.7	TVS 0.25 (trout)
Zinc	40	To Maintain and Achieve WQS at Segments 4a and 4b	2000 (TRec)	Monthly Standards (170 – 620)	Monthly Standards [730]
pH		3.7 -9.0		--	Monthly Standards [Existing Quality 5.9 – 9.0]

Notes:

-- Not applicable or not a Contaminant of Concern

\* Animas River Stream Segment 7 is Cement Creek and its tributaries. Segment 7 has a temporary modification to existing quality for all metals.

\*\* From dissolved fraction

[ ] Temporary Modifications for Segment 4a, beginning at TMDL compliance point A72

TRec Total Recoverable TVS Table Value Standards (Hardness of 200 ug/L assumed)

WQS Water Quality Standards

Sources: ARSG Bill Simon; Colorado Water Quality Control Commission Regulation 31; and Colorado Code of Regulations 5CCR 1002 Regulation 34: "Classification and Numeric Standards for San Juan River and Dolores River Basins;" and UOS 2006.

## **Attachment 1     Surface Water Sampling and Stream Discharge Form (Example)**

## **Attachment 2**

## **Chain-of-Custody Form (Example)**

Chain of custody forms and container seals will be supplied in advance of shipping by the EPA Region 8 Laboratory or commercial laboratory that will be used. Request the form and fill out as per instructions. Keep copy and send copy along in Ziploc baggie along with samples.





## **Attachment 3**

## **SOP for Filtration**

Source: "Standard Operating Procedures for the Filtration of Water Samples" from the Quality Assurance Project Plan for the Colorado Nonpoint Source Monitoring Program.

In 1988, the Colorado Water Quality Control Commission adopted the determination of metals concentrations in surface waters be based on the dissolved fraction rather than the acid soluble or total recoverable method used previously. This was based on EPA's acute and chronic criteria, which, in most cases, are equations that calculate the metals standard for a stream segment for aquatic life protection. (McConnell-Dissolved Metals monitoring-1988). The Aquatic Life criterion is based on the dissolved metals and the total hardness concentrations. Dissolved metals concentrations are used to develop water quality standards, source controls, to calculate loadings, and to develop remedial models. The methods described in this standard operating procedure document will focus on a "syringe" filtering procedure, used in the field by NPS personnel in determining dissolved metals concentrations. Another common filtration procedure is the use of a Geotech filtration unit.

### **EQUIPMENT**

60 cc syringe w/Luer-Lok tips.  
Swinnex disc filter holders, 47 mm diameter, polypropylene with silicone O-rings.  
Cellulose Acetate 47mm diameter, .45 um pore size filters.  
Deionized water used for rinsing.  
Teflon coated or nonmetal forceps.  
Pre-acidified 250 ml bottles.  
Precleaned and rinsed sample container. (1 liter bottle)

### **SITE AND SAMPLING CONSIDERATIONS**

Several considerations should be taken before an actual sample is obtained.

Make sure the area to be sampled is representative of that location's conditions, that is, below the mixing zone. Such things to consider are: contributing inputs such as confluences with other streams, discharges, runoffs, mine adits, or any other water body contributors.

If more than one site is going to be sampled, each site should have dedicated collecting and filtering equipment. This is not always practical where there are numerous sites to be monitored. In this case, 2 or more sets of equipment are used, one set at suspected contaminated sites, and one set for suspected clean sites. This technique reduces the possibility of contamination going from a highly polluted site to a relatively clean site. If one set of collecting equipment is going to be used, sampling should progress from the clean areas to the contaminated areas. Thorough or at least triple rinsing the equipment in the substrate to be sampled is the key to uncontaminated samples.

If sampling several locations on the same waterbody, a "downstream-to-upstream" approach will be used. This ensures that any substrate constituents that may be stirred up during the sampling

procedure are going to flow downstream as you work upstream and will not be introduced at the next station.

## **SAMPLE PREPARATION**

All sampling equipment must be cleaned and rinsed before any sample collection may take place. The EPA Region 8 Laboratory supplies all sampling containers and pre-acidified 250ml metals containers, which are cleaned under the laboratory's Quality Assurance Plan.

The filter holders and syringes must also be clean. Disassemble the filter holder apparatus. The O-rings on the upper and lower section of the holders are soaked in deionized water for 24 hours. The filter holders and syringes must be soaked in a 5% nitric acid, 95% deionized water mixture for 24 hours. Prior to use, the equipment must be rinsed with deionized water.

## **FILTRATION QUALITY ASSURANCE**

A duplicate filter sample will be collected at 10% of the sampling stations for QA purposes. The duplicate is taken out of the same container as the stream sample. Rinse the filter holder and place a new filter in the holder using the procedures described. The duplicate sample will be labeled "FILT DUP", along with the site name or number, date, time, and name. A "FILT BLANK" sample of the de-ionized water used in rinsing is taken at the end of each sampling day. The same rinsing and filtering procedure is used for the sample.

## **FILTRATION PROCEDURES**

Rinse a 1-liter neutral (unpreserved) container with the water to be sampled at least three times before gathering a sample to be filtered on-site or in a lab (camper-lab). Fill container and cap for later filtering. Filtering is done no later than a half an hour after collection.

Locate a dust free environment as possible, ideally, a mobile or camper lab to set up and filter.

Rinse the syringe and filter holder with de-ionized water.

Place a clean filter in the filter holding apparatus using non-metal (clean and rinsed) forceps.

- ♦ Run 50 ml of de-ionized water through the filtering apparatus using the syringe. Do not collect this.
- ♦ Run 50 ml of sample water through the filtering apparatus using the syringe, again, do not collect this.
- ♦ After being completely rinsed and flushed, the sample may be filtered into the pre-acidified container. Do not rinse the pre-acidified container. If the filter begins to clog, do not force the sample through the filter, but replace with a new filter after following the rinsing procedures.
- ♦ Fill the sample container to the rim of the pre-acidified bottle. The container has a predetermined amount of preservative for a full sample.

- ◆ Label bottle with the site ID, time, date, and sample type, i.e. "Filtered", "Filt Dup", or "Filt Blank".
- ◆ Immediately and thoroughly rinse all filtering equipment with de-ionized water before it dries and place in a zip lock storage bag for transport to the next site.
- ◆ Upon completion of a sampling run, the filtering apparatus should be taken apart and soaked in a mixture of 5% nitric acid and 95% de-ionized water for 24 hours as described above.

## Attachment 4

## Flow Measurement

If flow will be collected using a Marsh-McBirney, existing flume, or estimating, samplers will follow attached EPA SOP 722 and record the data on location-specific Stream Discharge Forms. If flow will be collected using a "Stream Pro ADCP" Doppler Discharge Measurement device manufactured by Teledyne RD Instruments, the steps below will be followed.

Section-By-Section Discharge Measurement Summary  
P/N 95B-6015-00 (October 2005) Teledyne RD Instruments

**Step 1.** Before you start data collection, you must configure the StreamPro for deployment. Make sure that power is turned on for the StreamPro ADCP, a Bluetooth connection is established, and use the **Setup** tab to run the **Site Configuration Wizard** or load a configuration file. Use the **Test** tab to test communications.

**Step 2.** In Section-By- Section, select the **Measurement** tab. Tap the **Start** button to initiate data recording.

**Step 3.** Select the edge you will start from (**Left Edge** or **Right Edge**) and enter the position of the edge in the **Edge of Water** box. If the edge is vertical instead of sloped, enter the **Edge Depth** and enter the **Correction** factor. This will be applied to the velocity measured at the next section and used to estimate the velocity in section 1. Tap **OK** to continue.

**Step 4.** Now move to the first vertical to be measured. Enter the **Section Flow Angle** if the StreamPro is not parallel to the current flow. The **Correction Factor** is the cosine of the **Flow Angle**. Enter the **Current Station** distance. Enter the **Next Station** distance. Tap **OK** to continue.

**Step 5.** Now the StreamPro will begin pinging and data will be recorded.

**Step 6.** If you are satisfied with the results for this station, tap **Accept Data**. If you want to repeat the station or if you want to change the position before repeating, tap the **Reject and Repeat** button. You will be returned to the start page for that station.

**Step 7.** If you accepted the previous data you are returned to the start page and the **Section Number** is incremented by one, from 2 to 3. Don't forget to move to the location of the **Current Station**. After checking to be sure you are at the correct position, tap **OK** to begin taking data. Repeat steps 5 to 7 and collect 20 or more sections.

**Step 8.** Check the **Edge** box when you reach the opposite shore. Enter the position of the final edge. If this edge is a vertical wall, then also enter the **Edge Depth** and the appropriate **Correction** factor. Tap **OK** to finish the entire measurement.

**Step 9.** A message box appears to confirm that the measurement is complete. Tap the **OK** circle button to see the measurement summary.

***Data Collections Tips***

- Check the **Edge** box (**Left** or **Right Edge**) for the first and last sections and enter the distance of the edge of the water. If the edge is vertical instead of sloped, enter the **Edge Depth** and enter the **Correction** factor.
- Minimize the StreamPro ADCP movement while section measurements are recorded.
- Collect 20 or more sections.
- RDI suggests doing a quick survey of the stream using the *StreamPro* software to get a value for the rated  $Q$ , if it is not known for the site.
- Each section should be sized so that it has less than 5% of the total rated discharge  $Q$ .
- Station distances can count up (1.5 meters, next station 2.0 meters) or down (2.0 meters, next station 1.5 meters) as necessary.



## Attachment 5      Animas River Watershed QA Corrective Action Request

Project: \_\_\_\_\_

Requested by: \_\_\_\_\_

Date: \_\_\_\_\_

Condition noted: \_\_\_\_\_

Is condition adverse to Quality of project? Yes \_\_\_\_\_ No \_\_\_\_\_

Person/organization responsible \_\_\_\_\_

Requested Change:

Corrective Action(s) taken to correct problem (to be filled out by person responsible, use additional pages if needed).

Corrective Action Plan Accepted \_\_\_\_\_ Date: \_\_\_\_\_

Verified by: \_\_\_\_\_ Date: \_\_\_\_\_

Corrective Action Accepted \_\_\_\_\_ Date: \_\_\_\_\_

HS / Paragon

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



## Environmental Division

July 30, 2009

Ms. Sabrina Forrest  
UPS EPA R8 LAB  
16 194 W 45<sup>th</sup> Drive  
Golden CO 80403

Re: ALS Paragon Workorder: 09-07-188  
Client Project Name: Upper Animas  
Client Project Number: None Submitted

Dear Ms. Forrest:

Twenty-one water samples were received from URS Operating Services, Inc. on July 17, 2009. The samples were scheduled for the following analysis:

Inorganics      pages 1-45

The results for this analysis are contained in the enclosed reports.

Thank you for your confidence in ALS Laboratory Group. Should you have any questions, please call.

Sincerely,

*Debbie Fazio (for)*

ALS Laboratory Group  
Amy Wolf  
Project Manager

ARW/mh  
Enclosure (s): CD

**Order Number:** 0906192**Fax Due Date:** 7/1/2009**Ship Date:** 7/2/2009

# Work Order

ALS Laboratory Group -- FC

Date Printed: Monday, June 22, 2009

**ProgSpecID:** URS\_Denver**Project ID:****Project Name:** Upper Animas**Project Manager:** ARW**Date Received:** 6/19/2009**Login Date:** 6/19/2009**Login Time:** 10:51**Login By:** cdt**Edit Date:** 6/22/2009**Edit Time:** 16:47**Edit By:** ARW**Released By:** ARW

<b>Client Information</b>		<b>Reporting</b>	<b>Special Requirements</b>
ClientID: URS_DENVER		PartialReports: No	QC Requirements: STANDARD
Client Name: URS Operating Services, Inc.		RptLevel: 4 Level	Limited Sample: No
Street: 1099 18th Street, Suite 710		EDD: Yes	Special DetLim: Normal
City: Denver State: CO Zip: 80202		<b>Safety</b>	Method Deviation:
Contact: Mark McDaniel		Prescreen: No	
Phone: (303) 291-8247		PrescrnComp:	
Fax: (303) 291-8296		Hazards:	
Path: URS			

**LabNotes:**

LabID: 0906192-1	FieldID: A72	NumBot: 1	Matrix: WATER	Date Collected: 6/18/2009	Sample Type: Regular sample
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Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-18	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

LabID: 0906192-2	FieldID: M34	NumBot: 1	Matrix: WATER	Date Collected: 6/18/2009	Sample Type: Regular sample
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Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

LabID: 0906192-3	FieldID: A68	NumBot: 1	Matrix: WATER	Date Collected: 6/18/2009	Sample Type: Regular sample
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Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

\*\*These items have been subcontracted.

\*\*This sample has been chosen by the client to be used for matrix qc.

**Order Number: 0906192**

Fax Due Date: 7/1/2009

Ship Date: 7/2/2009

Lab ID: 0906192-4 Field ID: CC48 NumBot: 1 Matrix: WATER Date Collected: 6/18/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

Lab ID: 0906192-5 Field ID: CCOPP-01 NumBot: 1 Matrix: WATER Date Collected: 6/18/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

Lab ID: 0906192-6 Field ID: CC-19 NumBot: 1 Matrix: WATER Date Collected: 6/18/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

Lab ID: 0906192-7 Field ID: CC-18 NumBot: 1 Matrix: WATER Date Collected: 6/18/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/23/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/30/2009

Lab ID: 0906192-8 Field ID: CC-07 NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-9 Field ID: CC03D NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

\*\*These items have been subcontracted.

\*\*This sample has been chosen by the client to be used for matrix qc.

**Order Number: 0906192**

Fax Due Date: 7/1/2009

Ship Date: 7/2/2009

Lab ID: 0906192-10 Field ID: CC02D NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009

Date Collected: 6/17/2009 Sample Type: Regular sample

Sample Location	Preserv	HT Expires
Rad Chem/SC-cold RU-19	NONE	6/24/2009
Rad Chem/SC-cold RU-19	NONE	6/24/2009
Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-11 Field ID: CC02D DUP NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009

Date Collected: 6/17/2009 Sample Type: Regular sample

Sample Location	Preserv	HT Expires
Rad Chem/SC-cold RU-19	NONE	6/24/2009
Rad Chem/SC-cold RU-19	NONE	6/24/2009
Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-12 Field ID: Blank NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-13 Field ID: CCOPP04 NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-14 Field ID: CCOPP03 NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

Lab ID: 0906192-15 Field ID: CC06 NumBot: 1 Matrix: WATER Date Collected: 6/17/2009 Sample Type: Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	160.1TDS	As Received	EPA160.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	160.2TSS	As Received	EPA160.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

\*\*These items have been subcontracted.

\*\*This sample has been chosen by the client to be used for matrix qc.



**Order Number:** 0906192**Fax Due Date:** 7/1/2009**Ship Date:** 7/2/2009**Lab ID:** 0906192-16 **Field ID:** CCOPP02 **NumBot:** 1 **Matrix:** WATER **Date Collected:** 6/17/2009 **Sample Type:** Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	180.1TDS	As Received	EPA180.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	180.2TSS	As Received	EPA180.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

**Lab ID:** 0906192-17 **Field ID:** CCOPP05 **NumBot:** 1 **Matrix:** WATER **Date Collected:** 6/17/2009 **Sample Type:** Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	180.1TDS	As Received	EPA180.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	180.2TSS	As Received	EPA180.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

**Lab ID:** 0906192-18 **Field ID:** CC01C **NumBot:** 1 **Matrix:** WATER **Date Collected:** 6/17/2009 **Sample Type:** Regular sample

Bottle ID	Test Nickname	Report Basis	Method	Fraction	Item Due Date	Sample Location	Preserv	HT Expires
1	180.1TDS	As Received	EPA180.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	180.2TSS	As Received	EPA180.2	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	6/24/2009
1	Acidity305	As Received	EPA305.1	Total	7/1/2009	Rad Chem/SC-cold RU-19	NONE	7/1/2009

\*\*These items have been subcontracted.

\*\*This sample has been chosen by the client to be used for matrix qc.

**Order Number: 0906192**

**Fax Due Date: 7/1/2009**

**Ship Date: 7/2/2009**

**Program Spec-Nickname Summary:**

**Program Spec ID: PAI Standard**

180.1TDS

180.2TSS

Acidity305

**Additional Sample Information:**

MatQC: LabID:	FieldID:	Matrix:	Temp:	SBD:	SED:	AirVol:	SampNotes:
<input type="checkbox"/> 0906192-1	A72	WATER		0	0		
<input type="checkbox"/> 0906192-2	M34	WATER		0	0		
<input type="checkbox"/> 0906192-3	A68	WATER		0	0		
<input type="checkbox"/> 0906192-4	CC48	WATER		0	0		
<input type="checkbox"/> 0906192-5	CCOPP-01	WATER		0	0		
<input type="checkbox"/> 0906192-6	CC-19	WATER		0	0		
<input type="checkbox"/> 0906192-7	CC-18	WATER		0	0		
<input type="checkbox"/> 0906192-8	CC-07	WATER		0	0		
<input type="checkbox"/> 0906192-9	CC03D	WATER		0	0		
<input type="checkbox"/> 0906192-10	CC02D	WATER		0	0		
<input type="checkbox"/> 0906192-11	CC02D DUP	WATER		0	0		
<input type="checkbox"/> 0906192-12	Blank	WATER		0	0		
<input type="checkbox"/> 0906192-13	CCOPP04	WATER		0	0		
<input type="checkbox"/> 0906192-14	CCOPP03	WATER		0	0		
<input type="checkbox"/> 0906192-15	CC06	WATER		0	0		
<input type="checkbox"/> 0906192-16	CCOPP02	WATER		0	0		
<input type="checkbox"/> 0906192-17	CCOPP05	WATER		0	0		
<input type="checkbox"/> 0906192-18	CC01C	WATER		0	0		

**†† These items have been subcontracted**

**\*\*This sample has been chosen by the client to be used for matrix qc.**

# ALS Laboratory Group -- FC

## Sample Number(s) Cross-Reference Table

**Paragon OrderNum:** 0906192

**Client Name:** URS Operating Services, Inc.

**Client Project Name:** Upper Animas

**Client Project Number:**

**Client PO Number:** OS-09-P-9883

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
A72	0906192-1		WATER	16-Jun-09	9:45
M34	0906192-2		WATER	16-Jun-09	11:00
A68	0906192-3		WATER	16-Jun-09	11:40
CC48	0906192-4		WATER	16-Jun-09	12:50
CCOPP-01	0906192-5		WATER	16-Jun-09	13:45
CC-19	0906192-6		WATER	16-Jun-09	15:05
CC-18	0906192-7		WATER	16-Jun-09	16:05
CC-07	0906192-8		WATER	17-Jun-09	9:35
CC03D	0906192-9		WATER	17-Jun-09	10:35
CC02D	0906192-10		WATER	17-Jun-09	12:00
CC02D DUP	0906192-11		WATER	17-Jun-09	12:00
Blank	0906192-12		WATER	17-Jun-09	12:25
CCOPP04	0906192-13		WATER	17-Jun-09	12:45
CCOPP03	0906192-14		WATER	17-Jun-09	12:25
CC06	0906192-15		WATER	17-Jun-09	13:50
CCOPP02	0906192-16		WATER	17-Jun-09	14:37
CCOPP05	0906192-17		WATER	17-Jun-09	14:20
CC01C	0906192-18		WATER	17-Jun-09	14:00



# Paragon Analyticals

A Division of DataChem Laboratories, Inc.

225 Commerce Drive Fort Collins, CO 80524

800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID)

Chain-of-Custody

Date

Page 1 of 2

Originator: Retain pink copy!

Project Name/No.: Upper Arkansas 9883 Sampler(s): Sabrina Forrest Debbie Cook Turnaround (circle one) Standard or Rush (Due \_\_\_\_\_) Dispose: Date \_\_\_\_\_ or Return to Client

Report To: Sabrina Forrest / William Schroeder

Phone: 303 312 6484

Fax: 303 312 6065

E-mail: forrest.sabrina@pa.gov

Company: USEPA R8 LAB

Address: 16194 W. 45th Dr.  
Golden CO 80403

Circle method (right); provide additional information as needed (comments).

Sample ID	Date	Time *	Lab ID	Matrix	Preservative (Indicate type... HCl, etc.)	No. of Containers	VOCs	BTEX (only)	SVOCs	OC Pesticides	PCBs	Herbicides	Explosives	TCLP Organics SW1311	TCLP Metals SW1311 Hg	Total Metals by ICP Hg	Dissolved Metals by ICP Hg	Total Metals by ICP/MS	Dissolved Metals by ICP/MS	Hexavalent Chromium	Inorganic Anions	Solids:	pH	TPH	Gross Alpha / Beta	Actinides by Paragon SOP	Tridium	Total Alpha-Emitting Radium	Radium 226	Radium 228	Strontium 90 (Total RadioSr)	Gamma Isotopes	Radon 222	Acidity as CaCO <sub>3</sub>	TSS	TSS
A72	F-12	06/16/09	0945	1	W	ice	1																													
M34	F-17	06/16/09	1100	2	N	ice	1																													
A608	F-10	06/16/09	1140	3	W	ice	1																													
CC48	F-21	06/16/09	1250	4	N	ice	1																													
CCOPP-01	F-19	06/16/09	1345	5	W	ice	1																													
CC-19	F-20	06/16/09	1505	6	W	ice	1																													
CC-18	F-22	06/16/09	1605	7	W	ice	1																													
CC-07	F-23	06/17/09	0935	8	W	ice	1																													
CC03D	F-11	06/17/09	1035	9	W	ice	1																													
CC02D	F-14	06/17/09	1200	10	W	ice	1																													

\* Time Zone: EST CST MST PST Matrix Key: O = oil, S = soil, NS = non-soil solid, (W = water) L = liquid, E = extract, F = filter

Comments: Adm: Amy Wolf PO: 9883

Relinquished By: Sabrina Forrest (1)  
Signature \_\_\_\_\_  
Printed Name Sabrina A Forrest  
Date 06/17/09 Time 1825  
Company USEPA

Received By: Lara J Orban (1)  
Signature \_\_\_\_\_  
Printed Name Lara J Orban  
Date 6/19/09 Time 0945  
Company ALS

Relinquished By: \_\_\_\_\_ (2)  
Signature \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_

Received By: \_\_\_\_\_ (2)  
Signature \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_  
Company \_\_\_\_\_



# Paragon Analytics

A Division of DataChem Laboratories, Inc.

225 Commerce Drive Fort Collins, CO 80524  
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Accession Number (LAB ID)

Chain-of-Custody

Date 6/17/09

Page 2 of 2

Originator: Retain pink copy!

Project Name/No.: Upper Animas P8883 Sampler(s): Forest/McPherson Turnaround (circle one) Standard or Rush (Due ) Dispose: Date or Return to Client

Report To: Sabrina Forest/William Schroeder

Phone: 303 312 6484

Fax: 303 312 6005

E-mail: forest, Sabrina@epa.gov

Company: US EPA RB LAB

Address: 16194 W 45th Dr

Golden, CO 80403

Circle method (right); provide additional information as needed (comments).

Sample ID F-24 F
--

\* Time Zone: EST CST MST PST Matrix Key: O = oil, S = soil, NS = non-soil solid, W = water, L = liquid, E = extract, F = filter

Comments:

Attn: Amy Wolf P0: 9883

Relinquished By:  
Signature: [Signature]  
Printed Name: Sabrina Forest  
Date: 6/17/09 Time: 1825  
Company: US EPA

Received By:  
Signature: [Signature]  
Printed Name: Lara J. Orban  
Date: 6/19/09 Time: 0945  
Company: ALS

Relinquished By:  
Signature: \_\_\_\_\_  
Printed Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Company: \_\_\_\_\_

Received By:  
Signature: \_\_\_\_\_  
Printed Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Company: \_\_\_\_\_



## CONDITION OF SAMPLE UPON RECEIPT FORM

Client: URS DenverWorkorder No: 0906192Project Manager: AWInitials: LSO Date: 6/19/09

1. Does this project require any special handling in addition to standard Paragon procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	<input checked="" type="radio"/> YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	<input checked="" type="radio"/> YES	<input checked="" type="radio"/> NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: _____ < green pea _____ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	YES	NO
16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.)	<input checked="" type="radio"/> N/A	YES	NO
17. Were the samples shipped on ice?		<input checked="" type="radio"/> YES	NO
18. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: <input checked="" type="radio"/> #2 #4	RAD ONLY <input checked="" type="radio"/> YES	NO
Cooler #: <u>1</u>			
Temperature (°C): <u>1.0</u>			
No. of custody seals on cooler: <u>2</u>			
External µR/hr reading: <u>13</u>			
Background µR/hr reading: <u>11</u>			
DOT Survey/Acceptance Information			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16

\* Samples #15 and 17 (CCOL and CCOPP05) were received at pH 3.

If applicable, was the client contacted? YES / NO / NA Contact: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Project Manager Signature / Date: July 6/22/09

\*IR Gun #2: Oakton, SN 29922500201-0066

\*IR Gun #4: Oakton, SN 2372220101-0002





LSR



Sabrina  
Forrest/R8/USEPA/US  
04/23/2009 08:12 AM

To Jack Sheets/TMS/R8/USEPA/US  
cc  
bcc  
Subject Re: Revised LSRs for Animas R

Thanks very much for the additions to the LSR. I approve these changes.

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
E-mail: forrest.sabrina@epa.gov

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Jack Sheets/TMS/R8/USEPA/US



Jack  
Sheets/TMS/R8/USEPA/US  
04/22/2009 04:30 PM

To Sabrina Forrest/R8/USEPA/US@EPA  
cc  
Subject Revised LSRs for Animas R

Sabrina

I have changed the LSRs to include Be and Cr by ICP-OE and As and Se by ICP-MS. I have also moved the all sampling events back by one month with the first one in May. There will not be any sampling in April. Rather than resend all the LSRs, if you could reply with your approval, I will add your email to the project folder.

Jack

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090063

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-May-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>	<u>Sample Number</u>
<b>Chloride by IC - R8</b>	16 water samples
Chloride	0.5 mg/L
<b>DOC -R8</b>	16 water samples
Dissolved Organic Carbon	0.5 mg/L
<b>Fluoride by IC - R8</b>	16 water samples
Fluoride	0.2 mg/L
<b>ICP Dissolved Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Calcium	100 ug/L
Iron	100 ug/L
Magnesium	50 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Potassium	1000 ug/L
Sodium	500 ug/L
Zinc	40 ug/L
<b>ICP Total Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Iron	100 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Zinc	40 ug/L
<b>ICP-MS dissolved metals -R8</b>	16 water samples
Arsenic	4 ug/L
Cadmium	0.2 ug/L
Copper	3 ug/L

**Laboratory Service Request (LSR) Number: R9090063**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL = Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag.  
Wrap each glass bottle in bubble wrap if possible.  
Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g.: 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

Samples delivered directly to the lab by the samplers):

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

Samples shipped by a common carrier:

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.



U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090066

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-June-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>		<u>Sample Number</u>
<b>Chloride by IC - R8</b>		16 water samples
Chloride	0.5 mg/L	
<b>DOC -R8</b>		16 water samples
Dissolved Organic Carbon	0.5 mg/L	
<b>Fluoride by IC - R8</b>		16 water samples
Fluoride	0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Calcium	100 ug/L	
Iron	100 ug/L	
Magnesium	50 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Potassium	1000 ug/L	
Sodium	500 ug/L	
Zinc	40 ug/L	
<b>ICP Total Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Iron	100 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Zinc	40 ug/L	
<b>ICP-MS dissolved metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	

**Laboratory Service Request (LSR) Number: R9090066**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

**Samples delivered directly to the lab by the samplers):**

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

**Samples shipped by a common carrier:**

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090067

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-July-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>		<u>Sample Number</u>
<b>Chloride by IC - R8</b>		16 water samples
Chloride	0.5 mg/L	
<b>DOC -R8</b>		16 water samples
Dissolved Organic Carbon	0.5 mg/L	
<b>Fluoride by IC - R8</b>		16 water samples
Fluoride	0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Calcium	100 ug/L	
Iron	100 ug/L	
Magnesium	50 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Potassium	1000 ug/L	
Sodium	500 ug/L	
Zinc	40 ug/L	
<b>ICP Total Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Iron	100 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Zinc	40 ug/L	
<b>ICP-MS dissolved metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	

**Laboratory Service Request (LSR) Number: R9090067**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL = Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403



**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag.  
Wrap each glass bottle in bubble wrap if possible.  
Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

**Samples delivered directly to the lab by the samplers):**

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

**Samples shipped by a common carrier:**

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090068

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-Aug-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>	<u>Sample Number</u>
<b>Chloride by IC - R8</b>	16 water samples
Chloride	0.5 mg/L
<b>DOC -R8</b>	16 water samples
Dissolved Organic Carbon	0.5 mg/L
<b>Fluoride by IC - R8</b>	16 water samples
Fluoride	0.2 mg/L
<b>ICP Dissolved Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Calcium	100 ug/L
Iron	100 ug/L
Magnesium	50 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Potassium	1000 ug/L
Sodium	500 ug/L
Zinc	40 ug/L
<b>ICP Total Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Iron	100 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Zinc	40 ug/L
<b>ICP-MS dissolved metals -R8</b>	16 water samples
Arsenic	4 ug/L
Cadmium	0.2 ug/L
Copper	3 ug/L

**Laboratory Service Request (LSR) Number: R9090068**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels :** require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms -** Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g.: 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

Samples delivered directly to the lab by the samplers):

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

Samples shipped by a common carrier:

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090069

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-Sept-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>	<u>Sample Number</u>
<b>Chloride by IC - R8</b>	16 water samples
Chloride	0.5 mg/L
<b>DOC -R8</b>	16 water samples
Dissolved Organic Carbon	0.5 mg/L
<b>Fluoride by IC - R8</b>	16 water samples
Fluoride	0.2 mg/L
<b>ICP Dissolved Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Calcium	100 ug/L
Iron	100 ug/L
Magnesium	50 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Potassium	1000 ug/L
Sodium	500 ug/L
Zinc	40 ug/L
<b>ICP Total Metals -R8</b>	16 water samples
Aluminum	100 ug/L
Iron	100 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Zinc	40 ug/L
<b>ICP-MS dissolved metals -R8</b>	16 water samples
Arsenic	4 ug/L
Cadmium	0.2 ug/L
Copper	3 ug/L

**Laboratory Service Request (LSR) Number: R9090069**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*



## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

Samples delivered directly to the lab by the samplers):

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

Samples shipped by a common carrier:

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090070

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-Oct-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>		<u>Sample Number</u>
<b>Chloride by IC - R8</b>		16 water samples
Chloride	0.5 mg/L	
<b>DOC -R8</b>		16 water samples
Dissolved Organic Carbon	0.5 mg/L	
<b>Fluoride by IC - R8</b>		16 water samples
Fluoride	0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Calcium	100 ug/L	
Iron	100 ug/L	
Magnesium	50 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Potassium	1000 ug/L	
Sodium	500 ug/L	
Zinc	40 ug/L	
<b>ICP Total Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Iron	100 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Zinc	40 ug/L	
<b>ICP-MS dissolved metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	

**Laboratory Service Request (LSR) Number: R9090070**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels :** require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms -** Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

***Note: Please enter each container on a separate line and group the containers by site location.***

**Samples delivered directly to the lab by the samplers):**

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

**Samples shipped by a common carrier:**

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090071

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-Nov-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>		<u>Sample Number</u>
<b>Chloride by IC - R8</b>		16 water samples
Chloride	0.5 mg/L	
<b>DOC -R8</b>		16 water samples
Dissolved Organic Carbon	0.5 mg/L	
<b>Fluoride by IC - R8</b>		16 water samples
Fluoride	0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Calcium	100 ug/L	
Iron	100 ug/L	
Magnesium	50 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Potassium	1000 ug/L	
Sodium	500 ug/L	
Zinc	40 ug/L	
<b>ICP Total Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Iron	100 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Zinc	40 ug/L	
<b>ICP-MS dissolved metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	



**Laboratory Service Request (LSR) Number: R9090071**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g.: 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

***Note: Please enter each container on a separate line and group the containers by site location.***

**Samples delivered directly to the lab by the samplers):**

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

**Samples shipped by a common carrier:**

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090072

Request Date: 20-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 19-Dec-2009 <b>Field Contact:</b> Lisa Richardson  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 18-May-2009  <b>Field Shipping Address:</b> Lisa Richardson 1357 Reese St Silverton CO 81433  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>		<u>Sample Number</u>
<b>Chloride by IC - R8</b>		16 water samples
Chloride	0.5 mg/L	
<b>DOC -R8</b>		16 water samples
Dissolved Organic Carbon	0.5 mg/L	
<b>Fluoride by IC - R8</b>		16 water samples
Fluoride	0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Calcium	100 ug/L	
Iron	100 ug/L	
Magnesium	50 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Potassium	1000 ug/L	
Sodium	500 ug/L	
Zinc	40 ug/L	
<b>ICP Total Metals -R8</b>		16 water samples
Aluminum	100 ug/L	
Iron	100 ug/L	
Manganese	2 ug/L	
Nickel	2 ug/L	
Zinc	40 ug/L	
<b>ICP-MS dissolved metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	

**Laboratory Service Request (LSR) Number: R9090072**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	3 ug/L	
Lead	1 ug/L	
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	

*Note: MRL= Method Reporting Limit*

## **Guidelines**

### **Agreement**

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### **Number of Samples**

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### **Sample Labeling and Chain of Custody**

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### **Shipments to the Lab**

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels** : require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms** - Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

**Samples delivered directly to the lab by the samplers:**

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

**Samples shipped by a common carrier:**

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.



U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: R9090063

Request Date: 09-Apr-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 22-Apr-2009 <b>Field Contact:</b> ?  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 22-Apr-2009  <b>Field Shipping Address:</b>   <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

Analysis

Sample Number

**Chloride by IC - R8**

16 water samples

Chloride 0.5 mg/L 0

**DOC -R8**

16 water samples

Dissolved Organic Carbon 0.5 mg/L 0.5

**Fluoride by IC - R8**

16 water samples

Fluoride 0.2 mg/L 0

**ICP Dissolved Metals -R8**

16 water samples

Aluminum	100 ug/L	20 100 ok ✓
Calcium	100 ug/L	100 ✓
Iron	100 ug/L	5 100 ok ✓
Magnesium	50 ug/L	50 ok ✓
Manganese	2 ug/L	2 ok ✓
Nickel	2 ug/L	2 ok ✓
Potassium	1000 ug/L	→ each that get lower
Sodium	500 ug/L	500 ok ✓
Zinc	40 ug/L	4 40 ok

**ICP Total Metals -R8**

16 water samples

Aluminum	100 ug/L
Iron	100 ug/L
Manganese	2 ug/L
Nickel	2 ug/L
Zinc	40 ug/L

**ICP-MS dissolved metals -R8**

16 water samples

Arsenic	4 ug/L
Cadmium	0.2 ug/L
Copper	10 ug/L → want 3 !!

**Laboratory Service Request (LSR) Number: R9090063**

Lead	1 ug/L	
<b>ICP-MS total metals -R8</b>		16 water samples
Arsenic	4 ug/L	
Cadmium	0.2 ug/L	
Copper	10 ug/L	> MRL + 3 ug/L
Lead	1 ug/L	
<b>Nitrate-N by IC low level - R8</b>		16 water samples
Nitrate as N	0.01 mg/L	✓
<b>Nitrite-N by IC low level -R8</b>		16 water samples
Nitrite as N	0.02 mg/L	✓
<b>Sulfate by IC - R8</b>		16 water samples
Sulfate as SO4	1 mg/L	✓ ok
<b>TOC - R8</b>		16 water samples
Total Organic Carbon	0.5 mg/L	✓ MRL 0.2

Note: MRL= Method Reporting Limit

**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels :** require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag. Wrap each glass bottle in bubble wrap if possible. Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

**Ice**

Sufficient ice must be added to each cooler to ensure ice will still be present when the cooler reaches the laboratory so temperature requirements are met.

**Chain of Custody Forms -** Fill in the following:

Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
Analysis - *list analysis requested related to appropriate container*  
Number of containers - *Number of containers from each location related to analysis*  
EPA Tag Number - *sample ID/unique bottle ID*  
Remarks - *other required sample information not addressed previously*

**Note:** *Please enter each container on a separate line and group the containers by site location.*

Samples delivered directly to the lab by the samplers):

sampler will use the signature and date/time block at the bottom of the form to relinquish custody. A copy of the chain of custody is removed and given to the person delivering the samples.

Samples shipped by a common carrier:

sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

## Guidelines

### Agreement

The Laboratory Service Request (LSR) must be completed and accepted by the Region 8 Laboratory and the EPA Site/Project Manager before any requested services will be performed. The only exception to this are samples requested by an "Emergency Response Team" where immediate human health is affected.

### Number of Samples

The submitter should notify the laboratory as soon as possible with changes in sample number, sampling/shipping dates, or if the project is cancelled.

If this request is being prepared by a state or contractor representative, approval by a U.S. EPA Site/Project Manager is required. Such approval indicates that the EPA Site/Project Manager is responsible for the number of samples submitted to Region 8 Laboratory.

### Sample Labeling and Chain of Custody

Each sample container to be delivered to the EPA Region 8 Laboratory must have a unique bottle ID attached. Samples must be accompanied by a complete and legible Chain of Custody and custody seals. Sample labels with unique IDs, Chain of Custody forms, and seals can be obtained from the laboratory.

### Shipments to the Lab

Samples cannot be accepted at the Region 8 Laboratory after 5:00 PM (Denver time) or on weekends. Friday deliveries must be coordinated in advance with the laboratory project leader or Laboratory Director at 303-312-7799.

If the original shipment or delivery date is changed due to rescheduling, equipment problems or weather, etc., please call the laboratory contact or the Laboratory Director to assure that the laboratory can accommodate the changes.

The shipping address for the EPA Region 8 Laboratory is as follows:

U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403

U.S. EPA Region 8 Laboratory  
Golden, Colorado 80403  
Laboratory Service Request

Laboratory Service Request (LSR) Number: 1001-01

Request Date: 30-Nov-2009

Project Information	Shipping Information
<b>Client:</b> Superfund - CERCLA <b>Project Name:</b> Animas River 2009 <b>Project Manager:</b> Sabrina Forrest <b>Timesheet Acct #:</b> 402D43C 0800BZ00 AP27 <b>Turnaround time:</b> 45 Calendar days  <b>Site Location:</b> Silverton, CO <b>Sampling Date(s):</b> 21-Jan-2010 <b>Field Contact:</b> Bill Simon  <b>Lab Contact:</b> Jack Sheets 303-312-7793	<b>Shipping Date(s):</b> 22-Jan-2010  <b>Field Shipping Address:</b> Bill Schroeder  <b>EPA Region 8 Laboratory Shipping Address:</b> U.S. EPA Region 8 Lab 16194 West 45th Drive Golden, CO 80403

**Matrix: Water**

<u>Analysis</u>	<u>Sample Number</u>
<b>Chloride by IC - R8</b>	16 water samples
Chloride 0.5 mg/L	
<b>Fluoride by IC - R8</b>	16 water samples
Fluoride 0.2 mg/L	
<b>ICP Dissolved Metals -R8</b>	16 water samples
Aluminum 100 ug/L	
Beryllium 1 ug/L	
Calcium 100 ug/L	
Chromium 2 ug/L	
Iron 100 ug/L	
Magnesium 50 ug/L	
Manganese 2 ug/L	
Nickel 2 ug/L	
Potassium 1000 ug/L	
Sodium 500 ug/L	
Zinc 40 ug/L	
<b>ICP Total Metals -R8</b>	16 water samples
Aluminum 100 ug/L	
Beryllium 1 ug/L	
Chromium 2 ug/L	
Iron 100 ug/L	
Manganese 2 ug/L	
Nickel 2 ug/L	
Zinc 40 ug/L	
<b>ICP-MS dissolved metals -R8</b>	16 water samples
Arsenic 4 ug/L	

**Laboratory Service Request (LSR) Number: 1001-01**

Cadmium	0.2 ug/L
Copper	3 ug/L
Lead	1 ug/L
Selenium	1 ug/L
Silver	0.5 ug/L

---

**ICP-MS total metals -R8**

16 water samples

Arsenic	4 ug/L
Cadmium	0.2 ug/L
Copper	3 ug/L
Lead	1 ug/L
Selenium	1 ug/L
Silver	0.5 ug/L

---

**Sulfate by IC - R8**

16 water samples

Sulfate as SO4	1 mg/L
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*Note: MRL = Method Reporting Limit*

## **Guidelines**

### **Agreement**

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### **Number of Samples**

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U.S. EPA Region 8 Lab  
16194 West 45th Drive  
Golden, CO 80403



**Sample labels and Chain of Custody Forms are required for all samples**

**Sample Labels :** require the following:

Station Location  
Date  
Time (*use military time, e.g.: 0835*)  
Sample ID - *unique bottle ID*

*or call the laboratory for project specific labels*

**Custody Seals:**

Place all sample containers into a large plastic bag.  
Wrap each glass bottle in bubble wrap if possible.  
Securely fasten the top of the bag with fiber tape. If you're unable to attach a signed and dated custody seal to the shipping container opening, a signed and dated custody seal must be placed around the top of the plastic bag, over the tape.

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Project Name/LSR Number  
Sampler(s) Name (Print and sign)  
Station No. (*will be used in the lab report*)  
Sample ID (*more descriptive of Station Number, but will not be used in lab report*)  
Date  
Time (*use military time, e.g. : 0835*)  
Matrix- (*See related numbers at bottom of form*)  
Preservative- *see related numbers at bottom of form*  
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sampler will sign, date and indicate "shipped via FEDEX, UPS", etc., in the "Relinquished by: (signature)" block. Retain a copy of the chain of custody record. Place the remaining form in a sealable plastic bag and tape to the inside cooler lid.

HASP

# **US EPA and BLM/USFS SITE SAFETY PLAN**

**Gladstone and Upper Cement Creek  
San Juan County, Colorado**

US EPA, Region 8  
Ecosystems Protection and Remediation  
Site Assessment Program  
(EPR-SA)

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**SITE SPECIFIC SAFETY PLAN ACKNOWLEDGMENT FORM**

SITE NAME: Silverton and Eureka Mining District

Proposed Dates: May and September 2009

Scheduled Equipment to Mobilize to Site: Stream flow measurement equipment; surface water sampling bottles/preservatives; Global Positioning Satellite (GPS) equipment; shovels; Avalanche gear- as needed.

Proposed Sampling Activities: Surface water sampling, stream flow measurement; and position data collecting with GPS.

Site Specific Safety Plan:

Prepared by Stephanie Odell – BLM/USFS upper Animas AML Project Manager

_____ Signature	_____ Name (Print)	_____ Date
--------------------	-----------------------	---------------

Read and understood by team lead personnel accessing the site:

_____ Signature Site Supervisor (SAM), Sabrina Forrest	_____ Name (Print)	_____ Date
---	-----------------------	---------------

_____ Signature, Site Safety Officer, William Schroeder	_____ Name (Print)	_____ Date
--	-----------------------	---------------

_____ Signature, ARSG Bill Simon	_____ Name (Print)	_____ Date
-------------------------------------	-----------------------	---------------

_____ Signature, BLM Lisa Richardson	_____ Name (Print)	_____ Date
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**ATTACHMENT****Daily Site Safety Briefing Acknowledgment Forms**



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## **SITE SAFETY PLAN**

### **Silverton and Eureka Mining District**

### **Spring 2009 to Spring 2011 Field Sampling**

This Site Safety Plan is based upon information provided by the United States Environmental Protection Agency (EPA) Region 8. If new information is obtained or identified, this Site Safety Plan will be amended as applicable.

This Site Safety Plan defines and designates Health and Safety requirements and protocols to be followed at the Silverton and Eureka Mining District during sampling and analysis activities. Applicability extends to all EPA, other Federal, and State employees who access the site.

**Note: All personnel who work on this site must understand this plan and sign the attached employee acknowledgment form or daily site safety briefing acknowledgment forms. In addition, a site briefing will be conducted prior to the initiation of operations, and on a daily basis prior to the commencement of each day's work. Documentation of these safety briefings will be logged in the field log book and on daily site safety briefing acknowledgment forms.**

## **1.0 SITE SAMPLING OBJECTIVES**

The Animas River and many of its tributaries above Silverton carry high concentrations of metals from both mining and natural sources. The ASRG and its member entities have undertaken extensive sampling to characterize the water quality of the upper Animas Basin, and prioritize locations where treatment could result in better water quality. The ARSG was responsible for assembling and analyzing all physical, chemical, and biological watershed information. They crafted the extensive Use Attainability Analysis for the Animas River Watershed, which was used to help the WQCC develop appropriate stream standards and TMDL throughout the watershed (ARSG, 2001). The adopted standards are based upon a combination of expected metal concentration reductions brought about by the remediation of 67 of the worse polluting mine sites and the biological potentials of the receiving streams.

The objectives for these sampling efforts will be to:

- Travel by automobile to the site
- Collect monthly water samples and flow measurements; and
- Assess changes in water quality and metals loads over time.
- Carry sampling supplies and equipment to and from the site
- Ship samples to the laboratory

## 2.0 KEY SITE PERSONNEL RESPONSIBILITIES

(For a complete listing of personnel and associated functions please see the *Site Specific Safety Plan Acknowledgement Form* located at the beginning of this document). Note that in the event a listed individual is not able to attend a sampling event(s), a replacement will be named prior to field activities.

### Site Supervisor

Sabrina Forrest will serve as Site Supervisor. Her responsibilities include, but are not limited to:

- Being knowledgeable of federal, state, local and company requirements applicable to the work assignments;
- Evaluating the potential hazards of projects and appropriately managing for control of these hazards;
- Establishing, through personal example, the desired safety environment for the performance of duties;
- Ensuring that all employees under her direction are properly qualified to complete their work assignments;
- Ensuring that all EPA employees under her supervision or control meet the eligibility requirements of the EPA Health and Safety Plan before they are allowed to enter a hazardous waste site or are assigned to a specific laboratory task that may result in workplace exposure to chemical hazards;
- Verifying that appropriate safety equipment and protective devices are provided for each job and are continuously in proper working order (this includes drinking water and other fluid replacement beverages);
- Identifying special training requirements and ensuring compliance as appropriate;
- Identifying and correcting health and safety deficiencies within her control and promptly notifying EPA management or health and safety staff of deficiencies outside their control; and
- Monitoring the condition of workers on site to assess need for work hour limitations.

### Site Safety Officer

William Schroeder will serve as the Site Safety Officer. His responsibilities include, but are not limited to:

- Conducting daily site safety meetings;
- Enforcing use of appropriate levels of protection, and procedures to minimize any hazards to EPA, other federal and state personnel, and community residents;
- Ensuring the preparation, approval, and enforcement of site-specific health and safety plans for assigned EPA tasks;
- Providing health and safety support for assigned EPA tasks;
- Assisting in the implementation of health and safety responsibilities of EPA management staff;
- Establishing, through personal example, the desired safety environment for the performance of duties;

- Ensuring that driving conditions are acceptable for movement of all vehicles;
- In the event of boat travel, ensuring that USCG-approved life jackets are provided for all personnel;
- Continually evaluating compliance with government health and safety regulations;
- Identifying special training requirements and ensuring compliance as appropriate;
- Recommending changes to the EPA health and safety plan as needed based on newly issued or revised regulations, experience, and loss-control practices;
- Identifying and correcting health and safety deficiencies within her control and notifying EPA management or health and safety staff of deficiencies outside her control; and
- Recommending changes in the work schedule of site workers in order to avoid accidents due to fatigue and environmental stress.

### **Snow and Avalanche Safety Advisor**

Lisa Richardson will serve as the snow and avalanche safety advisor. Her responsibilities will include:

- Advise the safety officer and site supervisor regarding snow conditions, safe travel to sampling locations; and
- Provide information regarding avalanche potential and avoidance.

## **3.0 EMERGENCY PROCEDURES/CONTINGENCY PLAN**

In the event of an emergency, Site Personnel should stop work and retreat to a designated area to determine appropriate response and establish site security and control. The designated area of retreat shall be determined by the Site Safety Officer at the site safety briefing prior to mobilization.

In the event of a medical emergency, personnel are highly discouraged from transporting personnel in private vehicles. Emergency medical services should be contacted, call 911, in all but the most minor medical conditions. In order to facilitate the provision of emergency medical services, the hospital site location information will be available in sampling vehicles for reference and guidance in the event of an emergency.

If a team member is taken to the clinic or hospital, their Medical Data Sheet should be taken for use by the treating physician. Each team member should complete his/her Medical Data Sheet, place it in a sealed envelope with "Medical Data Form" and their name on it, and take it to the field. The form should be kept in a location known to the other team members for use if needed.

### **3.1 Emergency numbers are as follows:**

Police, Fire or Medical Aid	911
Mercy Medical Center	(970) 247-4311
San Juan County Sheriff	(970) 387-5531

Silverton Fire (Non-emergency) (970) 387-5523

(EPA) National Spill Response Center (Spills>RQ) 800-424-8802

Rocky Mountain Poison Control Center (303) 739-1123, (800) 332-3073

### 3.2 Directions to Emergency Services:

The nearest hospitals/medical centers to Silverton are:

**Mercy Medical Center Of Durango** - about 55 miles south of Silverton, Durango, at  
1010 Three Springs Blvd.  
Durango, CO 81301  
(970) 247-4311

Three Springs Blvd. intersects the north side of Hwy 160 East between the Hwy 160 East / Hwy 550 South intersection (Farmington Hill) and the Hwy 160 / County Road 234 / Highway 172 intersection (Elmore's Corner). Directions are also available by calling (970) 247-4311.

**Montrose Memorial Hospital** - about 60 miles north of Silverton at 800 South Third Street Montrose, CO 81401 (970) 249-2211

### 3.3 Reporting of Accidents (for EPA Employees):

An **employee** who suffers a work injury or becomes involved in an accident, regardless of how minor, which may have resulted in an injury to himself or others, is required to report the accident and/or work injury as soon as possible to their supervisor, who will then contact the EPA Manager, Johanna Miller. Note all EPA employees participating in this sampling event must readily know or have access to their individual supervisor's contact information. Even if the accident information is incomplete, **notify management as soon as possible**. After accident information is received by management, the EPA Health and Safety Officer, William Daniels, must be notified immediately.

In case of an accident or injury, Johanna Miller will contact William Daniels of EPA Technical Management Systems. Upon notification of an accident, William Daniels will contact the EPA workers compensation insurance carrier and complete the necessary forms such as an OSHA 301 form, even if the information is incomplete.

The employee must advise the attending medical personnel that their injury is work-related so the medical facility can submit the appropriate information to EPA Human Resources (HR). EPA HR will initiate the claims process with the EPA workers compensation insurance carrier and any required notifications to the appropriate state.

During nights, weekends, or holidays, contact EPA Manager, Johanna Miller. If EPA Manager is unavailable, contact the EPA Health and Safety Officer. Either the Manager or Health and Safety Officer can contact the EPA workers compensation insurance carrier and initiate the claims

process with Travelers, who will provide for the employee a claim number and the claim handler's name. The employee will use this claim number for any related billing (hospital, medical, etc.). The claim number, claim handler's name, and all related information should be forwarded to William Daniels as soon as possible.

After initial notifications and verbal reporting, the employee should complete any accident reports and related forms.

Additional information can be found in the EPA, Region 8 Health and Safety Plan, Reporting of Accidents or Incidents.

### EPA EMERGENCY CONTACTS

Name	
Johanna Miller	Wk 303-312-6804 Cell 303-886-1635
William Daniels	303-312-6074

## 4.0 SAFETY AND HEALTH HAZARD ANALYSIS

The following sections identify the hazards related to the scope of work, and the chemical and physical expected on the site associated with the sampling and analysis tasks.

### 4.1 Task Hazards

TASK	HAZARD	CONTROL MEASURES
Driving	Road hazards, accidents, other drivers, speed limits	Practice good driving habits and obey traffic laws and regulations Follow appropriate TSOPs.
Property Access	Individuals and guard animals	Stop, look, and listen—observe no trespassing instructions
Water Quality Sampling	Slip, trips, falls, lacerations, heat, stress, wild animals, traffic, individuals, sunstroke	Wear safety equipment, gloves, hat, shoes, etc. Drink sufficient water Respect instructions of property owners. Use sunscreen Take breaks at appropriate intervals. Follow appropriate TSOPs.
Collecting QA/QC samples	Splash back, acid burns when aqueous sample is acidified.	Wear safety glasses and protective gloves. Pour away from the face.

Multi-meters for water quality parameters	Slip, trip, and falling	Properly operate the equipment to manufacturers directions. Properly position the equipment on a stable platform
Sample Transport in the Field	Slip, trip, and fall, and sample breakage	Use precautions appropriate when carrying samples in the field. Package all Samples appropriately Wear suitable field work gear to minimize chances of personal injury.
Sample shipping	Cuts, abrasions, slip, trips, falls, and lifting injuries, traffic.	Lift containers with the legs not the back Cut away from the body Watch the travel path when carrying sample coolers. Drive safely on the way to Fed EX.

## 4.2 Chemical Hazards of Concern

Chemicals	Exposure Limits	Source	Routes of Exposure
Aluminum, soluble salts, as Al	2 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Arsenic, metal and inorganic compounds	0.01 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Cadmium, metal and compounds	0.002 mg/m <sup>3</sup> TLV -TWA ACGIH; respirable fraction	Tailings/Water	Inhalation, skin contact, ingestion
Chromium, metal	0.5 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Chromium 6+, inorg. Compds, soluble	0.05 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Cobalt, metal	0.2 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Copper, soluble compounds, as Cu	0.05 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Gold, metal	No limits established	Tailings/Water	Inhalation, skin contact, ingestion
Iron, salts, soluble	1 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Mercury, inorganic compounds, as Hg	0.025 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Manganese, metal & inorg. Compds, as Mn	0.2 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Nickel, soluble compounds, as Ni	0.1 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Lead, metal and compounds	0.05 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Silver, soluble compounds, as Ag	0.01 mg/m <sup>3</sup> TLV-TWA ACGIH	Tailings/Water	Inhalation, skin contact, ingestion
Zinc oxide	2 mg/m <sup>3</sup> TLV-TWA ACGIH (respirable)	Tailings/Water	Inhalation, skin contact, ingestion
Nitric Acid	5.2 mg/m <sup>3</sup> TLV-TWA ACGIH	Preservative	Inhalation, skin contact, ingestion



Chemicals	Exposure Limits	Source	Routes of Exposure
Phosphoric Acid	1 mg/m <sup>3</sup> TLV-TWA ACGIH	Preservative	Inhalation, skin contact, ingestion
Sulfuric Acid	0.2 mg/m <sup>3</sup> TLV-TWA ACGIH (thoracic fraction)	Preservative	Inhalation, skin contact, ingestion

Personnel should always be aware of the chemical hazards and attempt to keep any exposures as low as possible. Procedures which will minimize the risk of chemical exposure to site personnel include:

- Hands should be washed frequently and always before meals.
- Disposable equipment will be used whenever possible.
- Disposable gloves will be worn during all sampling activities.

#### 4.3 Physical Hazards of Concern

The main physical hazards of concern include the following:

- Cold weather operations;
- Slips, trips, and falls;
- Vehicular travel;
- Rough terrain;
- Working at elevations; and
- Entering/exiting streams:
- Deep snow, melting snow conditions, and avalanche

In order to address these hazards, the following will be observed:

- The buddy system will be used at all times;
- Cold weather gear will be provided for use in the field;
- Sample team members will not travel to locations alone, and field hazards will be discussed at the daily tailgate safety meeting;
- Team members will be aware of potential cold stress symptoms;
- During in-stream activities waders or hip boots will be worn at all times;
- In the event team members experience discomfort due to high elevation location of work activities, the employee will be removed to lower elevation and work activity will cease. In the event conditions do not improve for the employee, 911 will be contacted;
- Team will take breaks as needed and drink plenty of fluids;
- Team will be aware of hazards entering/leaving any boats and practice good boat safety;
- Team will be aware of the physical hazards and walk/work carefully.

#### 4.2 Biological Hazards of Concern

During sampling activities team members may encounter the following biological hazards:

- Insect bites and stings
- Wildlife

A first aid kit will be kept in each field vehicle to treat minor insect bites and scrapes. In the event more serious injuries are encountered due to biological hazards, 911 will be contacted. Sample team members will be instructed to maintain awareness of their surroundings at all times and not to approach wildlife. Team members will be aware of potential biological hazards associated with the work, and wear insect repellent as needed. If any team members have sensitivities to insect stings, ect., the team should be aware of the sensitivity and location of any personal medication brought to the field; the sensitivity or allergy should be noted on the Medical Data Form as well.

## 5.0 TRAINING

All on-site EPA personnel will be current in meeting the OSHA training requirements as specified in 29 CFR 1910.120. The Site Supervisor and Safety Officer have also received the additional supervisor training. In addition, all personnel will:

- Review the Site Safety Plan prior to beginning field work;
- Attend the daily site-specific safety briefing prior to beginning field activities;
- Attend all other safety meetings;
- Maintain copies of all training records at site;
- Attend training in applicable work practices and procedures; and
- Attend training for Personal Protective Equipment needs and use.

## 6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Due to the nature of field activities being performed, modified Level D PPE will be required for each of the sampling events and will include the following:

- Safety glasses (sun glasses may be used as well)
- Hip waders/hip boots for in-stream activities
- Nitrile gloves for sampling activities
- Hiking boots for remote sampling locations
- USCG – approved personal floatation devices for boat work (none anticipated for this site)
- Snow shoes and/or cross country skis when necessary

The following safety equipment will be provided by EPA and available in field vehicles:

- First aid kit
- Fire extinguisher
- Mobile phone
- Decontamination equipment
- Nitrile gloves
- Ice
- Towels
- Sun screen

- Insect repellant

EPA Personnel will bring sun/safety glasses, waders, hiking boots, and cold weather gear.

## **7.0 MEDICAL MONITORING PROGRAM**

All EPA personnel involved in activities which could result in chemical exposure will be current participants in the EPA Medical Monitoring Program, which meets the requirements of 29 CFR 1910.120. Team members will be current in meeting those medical surveillance requirements and will be permitted to participate in this type of field activity according to their medical clearance.

## **8.0 AIR MONITORING PROGRAM**

Due to the nature and extent of contaminants (primarily metals contamination with limited soil sampling) associated with this sampling event (based on the results of past investigations), no air monitoring is anticipated during field sampling activities.

## **9.0 SITE CONTROL MEASURES**

### **9.1 Work Zones**

Since the majority of work will be performed in or around streams, appropriate precautions will be taken to avoid flooding of equipment and exposure of personnel to high stream flows. The Site Safety Officer will determine if stream flows are dangerously high and would thus preclude in-stream activities. In addition, individual team members may elect to refrain from in-stream activities if they feel conditions are unsafe.

### **9.2 Communications and Emergency Alarm System**

Due to the small project team size and the unlikelihood of conditions developing which would require immediate evacuation, verbal communications will be used among team members. A mobile telephone and/or two-way radio will be available, and all team members shall be informed of their location at the site safety meeting prior to commencing work. Personnel will confirm that dialing 911 on the mobile telephone will reach local emergency medical services prior to on-site operations.

### **9.3 The Buddy System**

Each team member will be accompanied by at least 1 other person at all times during each work day.

## **10.0 DECONTAMINATION**

All disposable personal protective gear will be bagged and removed from the site for proper disposal. Any contaminated wash and rinse solutions will be collected and properly disposed of upon return to

the Region 8 laboratory. Decontamination during this site investigation will include:

- Washing in-stream water quality meters;
- Washing sampling scoops (if not dedicated to individual sampling locations);
- Showering off-site at earliest convenience;
- Washing of sampling equipment with soap, water, and/or bleach solution.

**Note: Deionized water must be used for sampling equipment decontamination.**

## **11.0 CONFINED SPACE**

Confined space entry is not a requirement of this project.

## **12.0 SPILL CONTAINMENT**

There is minimal potential for any spill of hazardous chemicals at this site due to the nature of the work. However, should a spill occur, personnel should immediately contain the spill with available absorbent material, neutralize the spilled material if appropriate, and subsequently dispose of the spilled material appropriately.

## **13.0 HAZARD COMMUNICATION**

Only small amounts of hazardous chemicals (nitric, sulfuric, and phosphoric acids) will be used during field activities for sample preservation. MSDS documentation for these chemicals is stored at the Region 8 Laboratory and the hazards and precautions will be communicated to sample team members during the daily tailgate safety meeting. When using any acids for sample preservation, nitrile gloves and safety glasses will be worn, as will an outer laboratory coat or other protective covering.

## **14.0 STANDARD ON-SITE SAFETY PRACTICES**

All participants will conduct their work in accordance with the Peru Creek Mining District Site Safety Plan and applicable rules. Personnel will be directed to leave the site if they fail to observe the safety requirements or in any way create a safety hazard. Standard personnel precautions include the following:

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any contaminated area.
- Care must be taken when wearing personal protective equipment because of the increased potential for fatigue and/or heat stress related injuries due to dehydration etc.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible do not walk through puddles, mud and discolored surfaces; kneel on the ground; lean, sit or place equipment on drums, containers, vehicles, or on the ground.
- Medicine and alcohol can potentiate the effects of exposure to toxic chemicals. Prescribed drugs should not be taken by personnel working on site where the potential of absorption, inhalation or ingestion of toxic substances exists unless specifically approved by a qualified

physician. Alcoholic beverage intake should be minimized or avoided over the duration of the project.

- On-site personnel will be required to remove contaminated clothing and thoroughly wash hands and face prior to smoking, handling of any food or drink, using of any restroom facilities or leaving the site.
- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after protective garments have been removed.
- Slips, trips, and falls will be a constant hazard with the potentially loose dirt and cobble located throughout the watershed.
- Cold weather and potential snow related hazards will likely be present for some sites. Appropriate safety equipment and clothing.

00:00  
00:01  
00:02

00:03  
00:04  
00:05

# ATTACHMENT

10/10/11  
10/11/11  
10/12/11

10/13/11  
10/14/11  
10/15/11

**Daily Site Safety Briefing  
Acknowledgment Form**

Project Name: Upper Cement Creek Gladstone, Upper Cement Creek

Date	Name	Signature	Affiliation	Time In	Time Out
2/17/10	Sabrina Forrest	Sabrina Forrest	EPA	0900	1645
2/17/10	William C. Schroeder	William C. Schroeder	EPA	09:00	1645
2/17/10	Lisa Richardson	Lisa Richardson	BLM	09:00	1645
2/18/10	SABRINA FORREST	Sabrina Forrest	EPA	0900	1600
2/18/10	Lisa Richardson	Lisa Richardson	BLM	900	1600
2/19/10	William Schroeder	William C. Schroeder	EPA	09:00	16:00
3/16/10	William Schroeder	William C. Schroeder	EPA	8:00	20:30
3/16/10	Lisa Richardson	Lisa Richardson	EPA	8:00	20:30
3/17/10	William Schroeder	William C. Schroeder	EPA	8:00	20:00
3/17/10	Lisa Richardson	Lisa Richardson	EPA	8:00	20:00
4/13/10	SABRINA FORREST	Sabrina Forrest	EPA	0730	1950
4/17/10	William Schroeder	William C. Schroeder	EPA	07:30	1950
4/14/10	William Schroeder	William C. Schroeder	EPA	08:00	1900
4/14/10	Lisa Richardson	Lisa Richardson	EPA	8:00	1900

2030 for  
unloading samples  
equipment

1930 for  
unloading samples  
equipment

**Project Name:**

Upper Census Station, Cement Creek

[illegible]



**D. J. C. C. C. D. J.**

**Project Name:**

[illegible]

COINTEGRATING Cointegration, Cointegration, and Time Series

**Project Name:**

[illegible]

## Daily Site Safety Briefing

**Project Name:**

[illegible]

© 2000 Blackwell Science Ltd

[illegible]

Misc



**Travel Next Tuesday**  
William Schroeder to: Sabrina Forrest  
Cc: Gregory Saunders

02/11/2010 01:22 PM

Hey Sabrina-

Thought I'd send you a quick e-mail regarding picking up the government truck for our Animas River sampling event next week. First, since you will be leaving your car here for the week and potentially next weekend, you will need to meet with Greg Saunders to fill out a form so the security guards don't tow your car. I will plan on parking the Blue Silverado at the end of the F-wing at the far end of the building. I will have it packed with most, but not all, of the field gear. I will leave the keys in the field staging and storage room along with a cart that will be loaded with the other gear you will need to pack (two flow meters, DI water, 2 hydrolabs, etc.). The keys will be in the tan-colored pouch along with the gas credit card and a vehicle checkout form. Please be sure to record the date, mileage, # of gallons, fuel cost, and misc. expenses on the form each time you fill up. When the gas pump asks you for a driver number, enter the numbers that are shown at the bottom of the card (for the Silverado the number is 630751). When you return from the trip, sign and date the form at the bottom and give it to Jill Smits in the front office area. If Jill isn't around, you can leave the form in my office and I will take care of it. If you decide to return to the lab on Friday, February 19, please unload the flow meters, hydrolabs, and samples from the car so they don't freeze over the weekend. The field meters can be put back in the field room while the sample cooler can be placed in walk-in cooler B. Ask any lab staff member who is around on Friday for help in putting the samples in the cooler. If you can't find anyone, take the samples home with you and make sure they are iced through the weekend. Please let me know if you have any questions. Looking forward to a great trip!

-Bill-

William C. Schroeder  
US Environmental Protection Agency  
Region 8 Laboratory, 8 TMS-L  
16194 West 45th Drive  
Golden, CO 80403

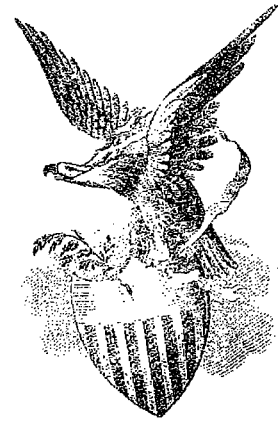
Phone: 303-312-7755  
Cell: 303-249-7457  
Fax: 303-312-7800  
Email: Schroeder.William@EPA.gov

# *Town of Silverton*

Post Office Box 250 Silverton, Colorado 81433-0250

TELEPHONE (970) 387-5522 FAX (970) 387-5583

E-MAIL: [astecK@silverton.CO.US](mailto:astecK@silverton.CO.US)



**CALL SNOW ROUTE # 387-5522 EXT. 11 AFTER 5:00 PM  
FOR INFO.**

## **SNOW ROUTES FOR ALL STREETS & ALLEYS**

**GREENE STREET:** RED ADVISORY MEANS NO PARKING ON GREENE ST. AFTER 12:00 AM,  
GREEN ADVISORY MEANS NO SNOW ROUTES IN EFFECT.

**ALL OTHER STREETS IN SILVERTON:** RED ALERT MEANS SNOW ROUTES ARE IN EFFECT.  
ON EVEN DAYS OF THE MONTH, VEHICLES SHALL BE PARKED ON THE EVEN ADDRESSED SIDE  
OF THE STREET BY 12:00 AM.

ON ODD DAYS OF THE MONTH, VEHICLES SHALL BE PARKED ON THE ODD ADDRESSED SIDE OF  
THE STREET BY 12:00 AM.

ALL VEHICLES MUST THEN BE MOVED TO THE OPPOSITE SIDE OF THE STREET AS SOON AS  
POSSIBLE AFTER THE SNOW HAS BEEN CLEARED.

**ALLEYS:** VEHICLES PARKED WITHIN THE ALLEYS MUST BE CLEARLY PARKED OUTSIDE OF THE  
14 FOOT ALLEY RIGHT OF WAY

**ANY QUESTIONS CALL 387-5522**



Sabrina  
Forrest/R8/USEPA/US  
05/11/2009 11:22 AM

To "William Simon" <wsimon@frontier.net>  
cc Margaret Williams/R8/USEPA/US@EPA, William  
Schroeder/TMS/R8/USEPA/US@EPA, czillich@fs.fed.us,  
stephanie\_odell@co.blm.gov,  
bcc

Subject RE: USGS gauge access - sampling May 18-22

Hi Bill et.al., We are going to have samplers in Silverton from Monday afternoon May 18th - until the 21st or 22nd. I am bring our new Site Assessment Manager (Margaret Williams) and Bill Schroeder (regional lab) down. I believe that Bill Schroeder has prepared the sample tags for us already. Bill Schroeder may leave Thursday with all our Region 8 samples if we are done by then. We will need to figure out shipping for the private lab's samples.

Bill and I are both bringing down multimeters, packs, and the avi equipment we have. I still need to talk to Schroeder about non-sampling equipment that he can bring to help support the team. Steph said she has a multimeter she will bring. I expect all field parameters to be taken at all sampling locations as written in the SAP. My working assumption has been that Bill Schroeder, Kirstin, and Stephanie would help us get organized into teams since they have the most field experience and I was unsure of your availability.

Steph is bringing Kay Zillich and Tom Johnson with her ( I don't have Tom Johnson's email, please forward this to him). Kirstin Brown said she would help out too and I assume that we still have Lisa Richardson available to help. I don't recall if Camille Price or Debbie Cokes were able to help out at all during the week, but we may have enough people to do what we need. It has been some time since I have done this type of work, so I don't have a feel for how many bodies we are going to need.

Steph and Lisa are supposed to get the HASP together using a couple templates Steph has and an example one I sent her too. Lisa was to get some snow safety information together for daily site safety briefings.

**All of the sample bottles, coolers, COCs from the EPA lab and private lab were mailed to Lisa Richardson's (recently sold) house. I don't think Lisa has had time to get to know the bottle types so I we may still need to spend some time Monday evening getting the bottles organized by sampling location. We may need 2-3 clean 5 gallon buckets; Bill Schroeder will likely bring some anyway, since that is how he likes collecting samples, but worst case, we should be able to get some from the hardware store.**

**I imagine that part of Tuesday morning we will need to get ourselves organized and figure out who needs to help where. By Tuesday late morning to early afternoon, we should be collecting samples.**

I have called and emailed D. Gray of USGS to find out for sure about accessing/reading those gauges.

**Regarding non-sampling equipment needs:**

Extra maps and tables showing our sample locations - I will bring those

2 copies of SAP - I will bring those

HASP sign off sheets - Steph/Lisa

GPS - Schroeder may be bringing one; I may be able to get a backup

Backpack, avalanche beacon, probe, shovel - for locations above Gladstone

Food, water, sunscreen, sunglasses, hats, gloves, packable rainjacket and pants, layers

Snowshoes with appropriate footwear; gaiters; ski poles

Skis/skins (???) (Lisa, What are conditions like; will it be better at this point to just snowshoe to locations?)

Packable First Aid kits; headlamp/extra batteries; firestarter

Chest waders and boots might be useful for the lower sampling locations

Each sampling team should have a camera and extra batteries - I will bring one EPA camera

Regarding communicating with each other - do radios work in Gladstone and higher? If so, does anyone



have any we could borrow?

Attached are the revised sampling location and analytical tables.



Revised Tables for LSR help.doc

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
E-mail: forrest.sabrina@epa.gov

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"William Simon" <wsimon@frontier.net>



"William Simon"  
<wsimon@frontier.net>  
05/08/2009 01:57 PM

To Sabrina Forrest/R8/USEPA/US@EPA  
cc

Subject RE: USGS gauge access

Sabrina, It looks like high flow is about upon us - it is moving fast. Unfortunately I am really busy this month. I will put out another call for volunteers - I need the exact dates however. We have the filters and syringes and one pH/cond. Meter but no DO meter. We probably need only take DO at the mines however, right. bill

-----Original Message-----

From: Forrest.Sabrina@epamail.epa.gov  
[mailto:Forrest.Sabrina@epamail.epa.gov]  
Sent: Thursday, May 07, 2009 12:20 PM  
To: wsimon@frontier.net  
Cc: stephanie\_odell@co.blm.gov; kirstin.brown@state.co.us  
Subject: USGS gauge access

Hi Bill, Do you know how to reach the USGS Durango contact (Dave Gray?)

to get keys for the gauging stations in case we can get those sampled?

Sincerely,

Sabrina Forrest  
Site Assessment Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street, Mail Code: 8EPR-B  
Denver, CO 80202-1129  
Direct Ph: 303-312-6484  
Toll Free: 1 800-227-8917, 312-6484  
E-mail: forrest.sabrina@epa.gov

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Internal Virus Database is out-of-date.  
Checked by AVG.  
Version: 7.5.557 / Virus Database: 270.12.11/2089 - Release Date:  
4/30/2009 5:53 PM

Internal Virus Database is out-of-date.  
Checked by AVG.  
Version: 7.5.557 / Virus Database: 270.12.11/2089 - Release Date:  
4/30/2009 5:53 PM



Jan\_Christner@URSCorp.co

m

04/26/2009 01:43 PM

To Sabrina Forrest/R8/USEPA/US@EPA

cc

bcc

Subject Message

History:

☒ This message has been replied to and forwarded.

My husband just told me you called while I was in Leadville a week ago. Sorry I haven't returned your call.

If you called about the meters for ARSG, I have 2 companies that supply this type of meter. They generally have dataloggers that record continual information. You just need someone local with the ability to go to the site to download the meters periodically. I don't recommend real-time data transmission because of the problems we've had at Standard Mine. The best data has been what we've downloaded directly.

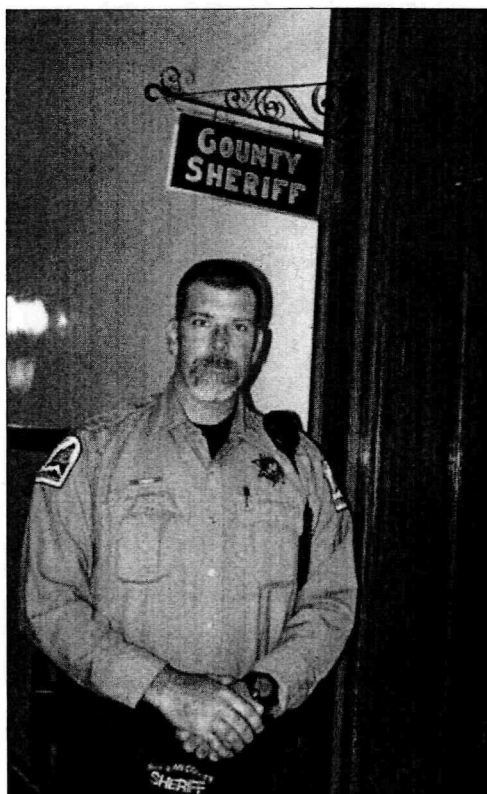
<http://www.globalw.com/> and <http://www.in-situ.com/>

You'll probably want to monitor flow rate (most important!!) and conductivity at a minimum. pH would be nice, but I'm not sure how reliable those meters are in freezing conditions. Is the flume outside or inside of the mine workings? Is it set so flow cannot go around it except during extreme conditions?

It would be great to get this monitoring started. It would give everyone a good idea of loading and therefore what can be achieved by stopping the flows.

Let me know if you have more questions. Sorry it took so long to get back to you on this one.

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Mark Esper/Silverton Standard & the Miner  
New San Juan County deputy Bruce Conrad stands outside the sheriff's office in the county courthouse.

## In brief

### Bruce Conrad hired as San Juan deputy

The San Juan County Sheriff's Office's newest deputy is a familiar face to Silvertonians.

Bruce Conrad, 39, a long-time resident, recently graduated from the police academy in Delta and has started work on the force.

He replaces former Undersheriff Brian Brian Wagner who has moved to Wyoming. Sheriff Sue Kurtz said this makes her department fully staffed.

The county's alpine ranger, who will again patrol backcountry roads this summer, will be starting work in mid-June.

### Films, discussions at First Congregational

First Congregational Church in Silverton will be hosting films and discussions for the next three weeks on Monday evenings at 6:30 p.m.

- June 1, "Forgiving Dr. Mengele."
- June 8, "Waitress."
- June 15, "Ram Dass: Fierce Grace."

### Historical Museum opens Saturday

San Juan County Historical Society Museum and Mining Heritage Center.

Hours are 10 a.m. to 5 p.m. Admission is \$5 for those 13 and older, children free.

## Team monitoring water on upper Cement Creek

Field work began last week for the Upper Cement Creek Water Quality Characterization project, with a team "braving frigid winter weather" to begin sampling at locations including the Gold King Mine.

The project involves Colorado Goldfields Inc., the Environmental Protection Agency, and the Animas River Stakeholders Group.

The team, including Debbie Cokes from Colorado Goldfields, collected water quality samples and captured flow measurements. Samples will be analyzed by EPA's lab in Denver.

The water sampling began on May 19, Colorado Goldfields announced in a press release, and includes the Gold King Mine, which is part of the system of historic mines that feed Cement Creek.

"I was happy to be a direct participant in this collaborative effort," said Cokes, environmental affairs manager for Colorado Goldfields. "Colorado Goldfields is committed to supporting these and future efforts to improve the environmental quality of the region."

The objectives of this characterization study are to collect monthly water samples and flow measurements, and to assess changes in water quality and metals loads over time.

It is anticipated that these efforts will generate recommen-



This photo provided by Colorado Goldfields Inc. shows an area on upper Cement Creek near the Gold King Mine where water quality is being monitored.

dations for stream standards and recommendations for remediation of contaminating sources.

The Gold King Mine is located within two miles of Gladstone, about eight miles upstream of Silverton on Cement Creek. It is the site of a historic mining town that developed in the 1880s with the advent of mining in the surrounding area.

The town was the central location and railroad terminus for the milling and shipping of mine ores from the surrounding three-square-mile valley. The

town itself declined in the 1920s and no remnants of the town remain.

Some of the area's old mines have acid drainage that flow directly or indirectly into Cement Creek and eventually into the Animas River.

Company officials note however that successful remediation projects at numerous mines in the region have already been completed.

This summer, the focus will turn toward Upper Gold King 7 level, and other historical sites located in the Cement Creek drainage pattern.

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## SMPA Annual Meeting

June 6, 2009

9:00 am - 1:00 pm

Ouray Town Park  
Ouray, Colorado

FREE  
BBQ

Games

Music

Prizes

SMPA is celebrating 70 years and wants you and your family to join us for a complimentary BBQ picnic in the park. All SMPA members and their families are welcome. All activities are free.

- Lunch • Children's Activities • Energy Exhibits •
- Bucket Truck Rides • Music & Entertainment • Prizes •

Business meeting begins at 10:00 am. We will hold our Director election for District 7. Cast your ballot at the annual meeting.

Celebrating 70 years



Ridgway: 626-5549 | Nucla: 864-7311 | www.smpa.com

134 Years in the Making

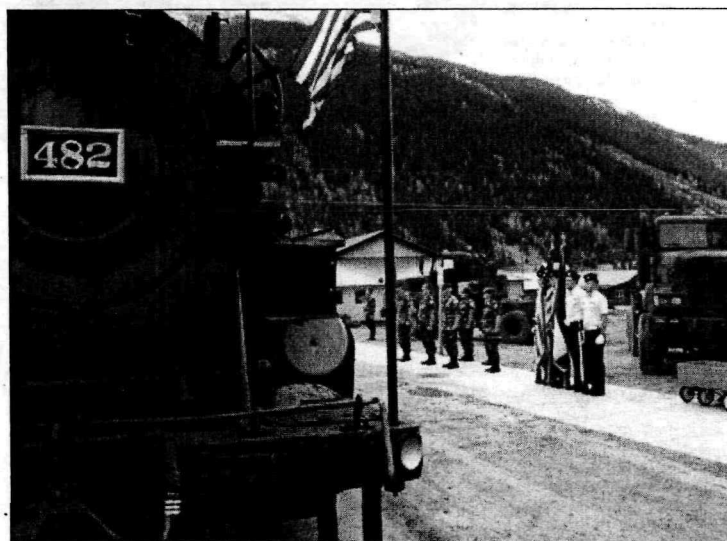
# Silverton STANDARD & the MINER

Weekly Silverton Standard (M-F)  
Silverton Standard & the Miner (Sat-Sun)

# SALUTE TO THOSE WHO SERVED

Pictured at left is the color guard at the Silverton Memorial Day ceremony Monday morning, May 25. From front are Silverton American Legion Post #14 members Gary Davis and Dick Wyatt with an unidentified visitor to Silverton. In the back is Ted Johnson. Below, Tim Black plays taps as Pat Swonger, center and Ed Jilka stand by. At center right, local American Legion Post members march in front of Town Hall. At bottom right, an honor guard greets the train as the Durango & Silverton Narrow Gauge Railroad conducts its own services later Monday.

Mark Esper/  
Silverton Standard & the Miner



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# The 10 Essentials for Backcountry Travel

by [Alicia MacLeay](#)

April 16, 2008

While a comprehensive hiking or backpacking list depends on many factors (season, climate, terrain, distance, activities, and personal preference), certain outdoor gear is considered essential whether you're heading off on an extended backcountry bushwhack or exploring the trails in your local woods.

For safer and more prepared front and backcountry travel, make sure you have the appropriate gear from each of the ten essential systems listed below.

## 1. Navigation

While the 10 essentials can vary depending on the trip you're taking and whom you ask, a detailed **topographic map** and **compass** have been at the top of the list since its 1930s debut by The Mountaineers club. Now, navigation tools may also include a **GPS receiver** or **altimeter**, but those are in addition to a map and compass, which never need batteries and work even in dense tree coverage. Of course, these tools only work if you also have the know-how to use them. Consider signing up for a navigation course.

### Tips:

- Store your topo map in a ziplock or other protective case or waterproof covering.
- A compass with a sighting mirror works as a signaling device in an emergency.

## 2. Sun Protection

Sunglasses, sunscreen (for skin and lips), and appropriate clothing is necessary for sun protection year round, but is especially important when on water, ice, snow, and at higher altitudes. The higher you go the more ultraviolet rays you're exposed to, increasing your risk of serious sunburn and skin damage, including cancer.

**Sunglasses** protect your corneas from ultraviolet light year round. Sunglasses, glacier glasses, and goggles also can help prevent snow blindness from sunlight reflecting off snow.

**Sunscreen** should be at least 15 SPF (though 30 is preferable), block UVA and UVB rays, and be applied anytime you go outside; even on cloudy days. Reapply frequently, including lips, particularly if you're sweaty or wet.

**Clothes** supply varying degrees of sun protection depending on their material, weave, color, and moisture content (a wet, cotton T-shirt is practically useless). Some clothes are treated to absorb more UV radiation and come with specific UPF ratings, which can be useful for desert hikes and other very sunny treks.

### Tips:

- Carry a backup if you rely on contacts or prescription glasses.
- Carry an extra pair of sunglasses for group outings.

### The Ten Essential Systems List

1. [Navigation](#)
2. [Sun protection](#)
3. [Insulation](#) (extra clothing)
4. [Illumination](#)
5. [First-aid supplies](#)
6. [Fire](#)
7. [Repair kit and tools](#)
8. [Nutrition](#) (extra food)
9. [Hydration](#) (extra water)
10. [Emergency shelter](#)





- *Fashion emergency eye protection from cardboard or cloth cut with small slits.*
- *Wear a cap or brimmed hat to shield your face.*
- *Don't forget to cover your neck.*

### 3. Insulation (extra clothing)

You checked the weather forecast before you left the trailhead, right? Even if it calls for clear skies and warm temperatures down below make sure to pack at least an extra layer, usually including wind and/or rain gear. Weather can change quickly, especially above tree line.

What you bring will depend on the season and outing and could range from a raincoat and long underwear tops and bottoms in summer to an extra insulated jacket, pants, gloves, and hat or balaclava in winter. No matter the season, avoid cotton, which loses its insulating value when wet.

Still not sure what to bring? *Mountaineering: The Freedom of the Hills* suggests you ask yourself this question: "What is needed to survive the worst conditions that could be realistically encountered on this trip?"

#### *Tips:*

- *Extra socks can be used on feet and hands.*
- *Don't judge by how you feel hiking uphill; you'll cool off once you stop moving.*
- *Anticipate whether you're likely to warm up or cool down and adjust layers in advance; your clothes will stay drier and your temp better regulated.*



### 4. Illumination

It was supposed to be a short day hike with you at home before dinner, but somehow you found yourself out after dark. A **headlamp** or **flashlight** can make the difference between an inconvenient nighttime walkout and an emergency situation.

Headlamps are widely preferred by backcountry travelers for their hands-free design, compact size, and light weight. Even on short day hikes a light should be carried; small emergency ones can be easily stashed in a pack. Always bring spare bulbs and batteries that fit your model of light.

#### *Tips:*

- *A light can be used as an emergency signaling device; some have a strobe option.*
- *You can carry fewer extras if your light, camera, and/or GPS receiver use the same batteries (just be sure your headlamp and GPS won't die at the same time).*



### 5. First-Aid Supplies

First-aid kits range from the basic, suitable to treating blisters and minor cuts on a day hike, to expedition-worthy kits geared toward extended travel and large groups. You can make your own or buy a pre-packaged one, but at a bare minimum you'll want: bandages in various sizes, gauze pads, disinfectant, over-the-counter pain medication, blister treatment, and any prescription medications.

Any first aid kit is useless without the knowledge to use it. Consider taking a wilderness first aid course and periodically brush up on your skills. Even if you've already passed a course, a small first aid guide inside your kit will help you—and your trip partners—deal appropriately with medical emergencies.

#### *Tips:*

- *Personalize your first aid kit to the individual medical needs of you and your party.*
- *Include feminine hygiene supplies if your group includes women.*



- *Include a pencil and paper.*
- *Store all first-aid supplies in a waterproof container or pouch.*

## 6. Fire

Being able to start and sustain a fire, even in wet, cold, and windy conditions, is essential. A fire can help prevent hypothermia by providing heat for survival, allow you to make a hot drink, illuminate surroundings, act as a signal, and boost morale. Because fire starting is so important, but can be difficult to do in emergency conditions, especially if you've never practiced, you may want to carry more than one type of fire starter for back-up systems.

Windproof pocket **lighters** are easy to use, but don't dismiss the value of having waterproof, windproof **matches**. A **fire starter**, as the name implies, helps ignite wet wood quickly. You can buy commercial fire starters or make your own from lint or cotton balls soaked with Vaseline. Store any matches and fire starters (even water- or storm-proof ones) in a waterproof container.

### *Tips:*

- *As their name implies, strike-anywhere matches don't require a special striking surface; safety matches do, limiting their usefulness.*
- *Don't rely on flimsy packs of matches.*
- *Know how to build a sustainable fire beyond the first step of lighting the tinder.*



## 7. Repair Kit and Tools

A pocket knife or multi-purpose tool can be used to repair broken gear, cut rope, prepare food, remove splinters, assist in first aid, and tackle other unforeseen challenges. Multi-tools include a range of implements beyond a blade—screwdriver, awl, pliers, and scissors—but each tool means more weight. You don't need three screwdrivers, two wire strippers, and a corkscrew. Choose a multi-tool with a good knife and only the implements you'd reasonably expect to use.

### *Tips:*

- *Wrap duct tape, the all-purpose fixer, around a water bottle.*
- *Zip-ties are small and light and can be useful for gear repairs.*
- *A sturdy sewing needle and thread, or even dental floss, can help you repair critical gear in the field.*
- *Consider carrying a maintenance and/or repair kit for stoves and other gear on longer expeditions.*



## 8. Nutrition (extra food)

Even on day hikes, bring along extra food, like energy bars. That's in addition to adequate food supplies for your outing. Your group may move slower or eat more than expected. For overnight trips you'll want an extra day's worth of food. Extra food should be easy to prepare, store well, and be high energy.

### *Tips:*

- *Hungry people can be cranky people. Don't skimp on snacks.*
- *Choose foods you and your partners enjoy.*
- *Carry out all trash and food scraps.*





## 9. Hydration (extra water)

Carry enough water per person and know where water sources are located on your route. A *general* rule of thumb is to have 3 to 4 liters (or 1 gallon) of water per person per day. The amount of water needed varies widely though, based on factors like temperature, humidity, and personal fitness and exertion levels.

Water availability is another factor. A **water filter**, **purifier** or **chemical treatment** (like iodine tablets) will allow you to treat water on the trail and carry less on your back. Always treat water, even if it looks clean, unless you want to experience Giardia or other unpleasant bugs.

### *Tips:*

- Drink your fill and top off water bottles before starting out from the trailhead.
- Leave extra water in the car for your return.
- Monitor hydration through urine output—volume, clarity, and frequency should remain normal. Clear and copious is a good sign.
- On longer, more strenuous hikes and backpacks, sports drinks and gels help replace electrolytes.
- Dry air dehydrates you faster in winter.
- Have a way to melt snow for water in winter conditions.



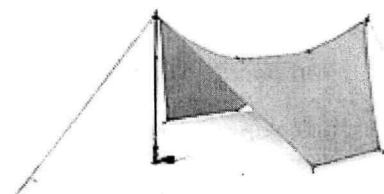
## 10. Emergency Shelter

Shelter is a new addition to the classic 10 essentials list and what you carry will depend on the season and conditions. If you're backpacking, you'll probably already have a tent, bivy, or tarp, but even on day hikes you need to be able to fashion a shelter from rain, snow, and wind.

Consider carrying an ultralight tarp, emergency blanket, or lightweight emergency bivy sack. In winter conditions, emergency shelter becomes even more important and may mean carrying a four-season bivy or small tent, even on day outings.

### *Tips:*

- Each person in a large group can carry a heavy-duty plastic trash bag.
- In winter, know how to safely build a snow cave.



## 11. Common Sense

You've packed up all of your necessary gear, told someone where you were going and when you'd return, and are ready to hit the trail. Don't forget the most important item of all—your common sense. The most-technical and award-winning gear available won't keep you safe if you keep climbing into an oncoming thunderstorm or get swept away trying to ford a storm-swollen stream. Respect your limits and abilities—and those of your entire group—and you will come back to enjoy many more outdoor adventures.

## Extras

A **signaling device**, like a whistle or signal mirror, can help rescuers locate you if you get lost or hurt. The better you're able to make yourself seen or heard, the better your chance that a search and rescue team will find you. Make sure kids know that whistles are for emergencies only.

Don't depend on a **cell phone** or other **communication device** for rescue. However, a cell phone or messenger device, like Spot, may allow you to alert others if you'll be late or can help search and rescuers locate you. Keep your cell phone off until you need it though, and reserve it for emergencies only.

Remember the **insect repellent**.

**Editor's Note:** To learn more about any of these essential systems or for in-depth information on all things mountaineering and backcountry travel, get a copy of *Mountaineering: The Freedom of the Hills* (now in its 7th edition, 2004), published by The Mountaineers.


posted April 16, 2008

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